SPECIALITY **APPLIED ELECTRONIC SYSTEMS**

EDUCATIONAL DEGREE **BACHELOR**

PROFESSIONAL QUALIFICATION **ELECTRONICS ENGINEER**

The purpose of the specialty is to train personnel with knowledge, skills, habits, attitudes and values related to modern, fast-growing, electronic technologies and technology. The Bachelor of Applied Electronic Systems must acquire the ability to improve their knowledge and skills, possess basic computer tools and technologies, and have a very good linguistic communication ability, thanks to which they can maintain their professional level at the current level. Thus, the trained personnel have a high adaptability in the market environment and are ready to cover the needs of modern technical personnel in the field of electronic equipment and technologies.

REQUIREMENTS FOR SPECIALIST TRAINING

Engineers in the specialty "applied electronic systems" should be ready to perform such actions as: analysis, design and construction of elements, equipment and systems in electronics, a variety of analog, digital and microprocessor devices, measuring and diagnostic equipment, automation and control systems for programmable logic controllers, electronic measurement, control and control systems;

To organize and manage the production, installation, operation and repair of electronic equipment and systems; to carry out consulting and commercial activities related to electronic technologies, equipment and systems, to lead a team of specialists.

Engineers in the specialty "applied electronic systems" must have the necessary fundamental and general engineering knowledge, thorough special and very good practical training in their profession; use computer technology; be with a good general culture; be able to independently improve their knowledge and skills.

Bachelor of Applied Electronic Systems Engineer must:

- to obtain the necessary knowledge from the field of higher mathematics, physics, electrical engineering, electrical measurements, materials in electronics, computer programming and use, engineering graphics, electrical safety and ecology, which determine the theoretical foundation of the professional direction " electrical engineering and electronics and automation";
- to learn the principles of operation, the main parameters and characteristics of semiconductor elements and chips; has knowledge of analog, digital and microprocessor circuitry, regulating and converting electronic devices;
- familiarity with the design and technology of electronic equipment, as well as methods and software for their computer-aided design and documentation; knowledge of methods and technical means for measurements in electronics;
- knowledge of programming languages with industrial controllers, technical

automation tools and construction of control, control and surveillance systems of medium complexity;

- to have knowledge of the basics of communication, computer, insurance and security equipment and wireless systems and technologies, as well as their application in the development of modern automation and process control systems ;
- introduction to electronic renewable energy management systems;
- get the skills of computer diagnostics of modern car systems;
- to have knowledge in the field of medical electronics and modern innovative bio medical systems;
- to have knowledge of the relevant specialty terminology in English, allowing you to use reference technical literature and documentation.

PROFESSIONAL SKILLS AND KNOWLEDGE

Graduates of the Bachelor's degree in Applied Electronic Systems receive professional competencies in the development, use, implementation, operation, exploration, design, implementation, operation, production, technological, corporate and service activities in the field of electronic systems and technologies. The acquired educational qualification degree "bachelor" in the specialty "applied electronic systems" has practical skills: working with a computer and using applied software products, designing and documenting electronic circuits and devices; use a measuring device for measuring the parameters of components and devices, analyzing electrical signals, tuning and diagnostics of electronic circuits and devices, including microprocessor technology; design and Assembly of printed circuit boards and electronic devices of medium difficulty; the development of procedures and documentation of printed circuit boards, electronic assemblies and devices; recovery and configuration of electronic components and devices; selecting, programming and process control programmable logic controllers and industrial communication networks. Acquire the skills of independent operations related to production, installation, operation, repair and maintenance of digital objects is of medium complexity, the ability to apply rational methods in the organization of its work and activities of those who govern; to carry out consulting and trading activity in the field of electronic devices and systems, organize and manage the production, installation, maintenance and repair of electronic structures and systems.

THE FIELD OF PROFESSIONAL SELF-REALIZATION

The Bachelor of Applied Electronic Systems can be implemented in all private, corporate and public companies, public administration, electronic and information technologies, production, operation, engineering, installation and maintenance, sale and distribution of electronic devices and systems, maintenance and administration of industrial computer networks, service specialists in companies for electronic equipment and information

technology and technology, regional and municipal companies for alarm and security and fire systems; managers of maintenance, repair, operation and maintenance of electronic systems, including renewable energy sources, medical and automotive electronics; teachers in specialized secondary technical schools, after acquiring additional pedagogical ability, can continue their education in master's programs.

POSITIONS THAT CAN BE HELD, ACCORDING TO THE NATIONAL CLASSIFIER OF PROFESSIONS AND POSITIONS

Engineer, Production; Engineer, Production Efficiency; Engineer, Production Planning; Manager, Production Technology; Analyst, Systems; Designer, Systems; Standardizer; Engineer, Quality; Risk Engineer; Automation Engineer; Engineer, Insurance Equipment; Engineer, Equipment; Engineer ,e-technical archive; Engineer, Electronics (Semiconductor engineering); Engineer, Electronics; Engineer, Electronics (Computer design); Engineer, Electronic Tools and Devices; Engineer, Instrumentation and Automation; Expert, Metrological support; The organizer of the repair and maintenance expert for sales; trade proxies.

DEGREE COURSE OF APPLIED ELECTRONIC SYSTEMS

First academic year			
First semester	ECTS credits	Second semester	ECTS credits
Mathematics For Engineers I	6	Mathematics for Engineers II	6
Foreign Language I	3	Physics for engineers II	6
Programing I	6	Theoretical Electrical Engineering	6
Engineering graphics	5	Foreign Language II	3
Physics for engineers I	5	Constructing elements in electronics	4
Electrotechnical materials	5	Electrical measurements	5
Sport	0	Sport	0
	Total: 30		Total: 30
Second academic year			
First semester	ECTS credits	Second semester	ECTS credits
Microprocessor technology	6	Digital electronic	6
Mathematics for Engineers III	5	Power conversion techniques and power supplies	6
Analogue electronic	6	Foreign Language III	6
Theoretical Electrical Engineering	4	Electrical Measurements	6
Technological Practice I	3	Programing II	6
Signals and systems	6		
	Total: 30		Total: 30
Third academic year			
First semester	ECTS credits	Second semester	ECTS credits
Elective of the first group	2	Programing logical controllers	7
Design and reliability of electronics equipment	6	Sensors and sensor networks	7
Telecommunication techniques	6	Technological Practice II	5
Elective of the second group	6	Data transfer and computer	6
Electronic devices for command and control	6	communications	
Internet of things (IoT)	4	Embedded Systems	5
Elective choice *Project on Digital electronics* *Project on Power conversion techniques* *Web design* *Applications for mobile devices* *Written and spoken culture*			
	Total: 30		Total: 30

Fourth academic year			
First semester	ECTS credits	Second semester	ECTS credits
Elective of the third group	3	*Elective of the fifth group*	5
Technological Practice III	7	Pre-Graduate Project	6
Cybersecurity	7	*Elective of the six group*	4
Elective of the fourth group	6	Computerized devices and	5
Technologies in applied electronic systems	7	for real-time operation	
		Diploma Thesis	10
Elective choice		*Elective choice*	
Embedded Computer Systems		*Automotive Electronics*	
Project		*Car computer diagnostic systems*	
Project on technologies in applied electronic systems		*Renewable energy sources and systems*	
Biomedical electronics		*Electronic control devices for alternative energy sources*	
Biomedical data management information systems			
	Total: 30		Total: 30

ANNOTATION OF COURSES

MATHEMATICS FOR ENGINEERS I

ECTS credits: 6	**Semester:** 1
Evaluation: Written exam	**Hours per week:** 2 + 2 + 0
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Prof. Iliya Gyudjenov, PhD - iliadgl@swu.bg
Assistant: Ch. Assistant 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:

Training in the academic discipline includes:

In the curriculum deals with the questions of linear algebra, analytic geometry and differential calculus of functions of a real variable. The basic concepts of complex numbers are given. From linear algebra, we study matrices, determinants, systems of linear equations and methods for solving them, linear spaces and linear transformations (operators), square forms of analytical geometry, vectors and actions with them, straight lines and plains, lines and surfaces of the second degree. The main objective of the course is to provide students with a fundamental preparation for mastering other mathematical and technical disciplines.

Purpose of the course:

The purpose of this course is that students can solve systems of linear equations using two methods-Gauss and Kramer formulas, apply the studied modeling theory and solve real practical problems; use one of the classical methods of studying geometric objects - analytical; be able to establish a correspondence between algebraic objects, determine their properties and be able to transfer the same to others that are difficult to study.

Educational Methods:

Conducting conversations and analyses during a lecture course of seminar exercises.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

FOREIGN LANGUAGE - I

ECTS credits: 3	**Semester:** I
Evaluation: Written exam	**Hours per week:** 0 lectures+3 seminar exercises +0 laboratory exercises
Course type: Seminar exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assist. Prof. Bilyana Georgieva, PhD - bilianag@yahoo. com, bilianag@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 aim of the course „Foreign language - English" is to ensure the development of communication skills, reaching of certain phonetic, grammatical, lexical and thematic minimum, skills and habits for participation in real, communicative situations, knowledge and individual work with vocabulary. It aims to review and systematize the basic knowledge of the undergraduates and provides equal start level for the next stage of education, called "language of the programme". The choice of topics is based on their high particularly in the scientific style of speech and their unconditional structural significance and necessity of learning a foreign language. Widely used communicative exercises focus that strengthen the necessary grammatical habits and encourage students to be active speech activity in the studied subjects. The practical course is based on the thematic texts reflecting everyday student life, elementary special technical terminology on the subject and aims to stimulate the desire and motivation of students to enhance their language and consistent level - Elementary and Preintermediate.

Purpose of the course:

The aim of the course is to build an initial communicative competence, as the ability to understand and draw meaningful oral and written statements, in accordance with the rules of the English language to develop reading skills and comprehension of texts from everyday communication and presentation and related texts the basic terms in the specialty; develop skills in technical vocabulary can make translations of technical texts from English into Bulgarian language using a dictionary.

Educational Methods:

Active methods are used through different exercises; based tests are made for control of the learned, translation of technical literature.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

PROGRAMING - I

ECTS credits: 6	**Semester:** 1
Evaluation: Ongoing assessment	**Hours per week:** 2 lectures + 0 seminar exercises + 2 laboratory exercises
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Ivan Trenchev, PhD - trenchev@,swu .bg
Assistant: Assistant Ivan Todorin, PhD - ivan todorin@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.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

ENGINEERING GRAPHICS

ECTS credits: 5	**Semester:** 1
Evaluation: Ongoing assessment	**Hours per week:** 1 + 0 + 3
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof., Eng. Evdokia Petkova, PhD - e.p.petkova@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 "Engineering Graphics" 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.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

PHYSICS FOR ENGINEERS – 1

ECTS credits: 5	**Semester:** 1st
Evaluation: written exam	**Hours per week:** 2 lectures+1 laboratory exercises
Course type: lectures+ laboratory exercises	**Course status:** Compulsory
	Degree course: Applied Electronic Systems

Lecturer: Assoc. Prof. Dimitrina Kerina, PhD, e-mail: d_kerina@swu.bg
Assistant: Assoc. Prof. Raya Chingova, e-mail: rajkach@swu.bg
Department: "Electrical engineering, electronics and automation"
2700 Blagoevgrad, 66 Ivan Mihailov str., *Phone:* +359-73-88 51 63
Fax: +359 88 98 71 77 47, E-mail: technical_eea@swu.bg

Annotation:

The training in the course includes:

- Basic Concepts of Kinematics and Dynamicsм
- Oscillations and Waves;
- Dynamics of the Fluids and
- Basic Concepts of Thermodynamics and
- Molecular-Kinetics Theory.

Purpose of the course:

The course in Physics for Engineers – I aims to provide knowledge about objective fundamental natural laws, basic Physical methods of investigation and basic Physical concepts and relations.

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.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

ELECTROTECHNICAL MATERIALS

ECTS credits: 5	**Semester:** 1st
Evaluation: written exam	**Hours per week:** 2 lectures+1 laboratory exercises
Course type: lectures+ laboratory exercises	**Course status:** Compulsory
	Degree course: Applied Electronic Systems

Lecturer: Assoc. Prof. Dimitrina Kerina, PhD, e-mail: d_kerina@swu.bg
Assistant: Vassil Kovachev, e-mail: vasbl@swu.bg
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Annotation:

The training in the cource includes:

- Fundamentals of the material knowledge;
- Material's non-electrical properties;
- Dielectrics, Conductors, Semiconductors;
- Magnetic and Optical materials;
- Applications of the passive components resistors, capacitors and inductors are considered.

Purpose of the course:

The course in Electrotechnical Materials aims to provide knowledge about behavior and processes that occur in different types of electrical materials - dielectrics, conductors, semiconductor and magnetic materials when they are placed in an electric, magnetic and thermal field as well as radiation.

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.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

MATHEMATICS FOR ENGINEERS -2

ECTS Credits: 6 credits	**Semester**: 1
Assessment: written final exam, two problems solving tests per semester	**Hours per Week/SS**: 2 lecture hours and 2 tutorial hours
Course Type: lectures and tutorials	**Course Status:** Compulsory Course in the Electronics B.S.
	Specialty: Applied electronic systems

Lecturers: Prof. Oleg Mushkarov DSc; Department of Electrical Engineering, Electronics and Automatics, e-mail: muskarov@math.bas.bg;
Ass. Prof. Anka Markovska PhD; Department of Electrical Engineering, Electronics and Automatics, e-mail: a_markovska@swu.bg;
Department: "Electrical Engineering, Electronics and Automation"
2700 Blagoevgrad, 66 Ivan Mikhailov Street, tel .: 073/88 51 63
fax: 0889871747, E-mail: technical_eea@swu.bg

Course Description: Main topics:

- Integral calculus of functions of one real variable - indefinite integral, basic integration techniques, definite integral - classes of integrable functions, properties of the definite integral
- Functional sequences and series
- Differential calculus of functions of several variables- partial derivatives of first and higher order, local and global extrema of functions of several variables
- Ordinary differential equations
- Integral calculus of functions of several variables- double and triple integrals and their calculation, change of variables, geometric and physical applications
- Path integrals - definition, properties, calculation, applications.

Course Aims:

The course aims to provide mathematical foundations for further study of other general disciplines such as physics , electrical engineering , etc. and all special technical disciplines. This course sets also some educational objectives as the development of algorithmic thinking and capabilities for mathematical modelling of natural phenomena.

Teaching Methods: lectures and lab exercises

Requirements/Prerequisites: Mathematics (Differential Calculus of Function of One Real Variable, Linear Algebra, Analytic Geometry, Differential Equations)

Registration for the Course: Compulsory

Registration for the Exam: coordinated with lecturer and Student Service Department

PHYSICS FOR ENGINEERS – II

ECTS credits: 5	**Semester:** 2st
Evaluation: written exam	**Hours per week:** 2 lectures+1 laboratory exercises
Course type: lectures+ laboratory exercises	**Course status:** Compulsory
	Degree course: Applied Electronic Systems

Lecturer: Assoc. Prof. Dimitrina Kerina, PhD, e-mail: d_kerina@swu.bg
Assistant: Assoc. Prof. Raya Chingova, e-mail: rajkach@swu.bg
Department: "Electrical engineering, electronics and automation"
2700 Blagoevgrad, 66 Ivan Mihailov str., *Phone:* +359-73-88 51 63
Fax: +359 88 98 71 77 47, E-mail: technical_eea@swu.bg

Annotation:

The training in the course includes:

- Electrostatics;
- Stationary Electromagnetic Field;
- Alternative Electromagnetic Field;
- Electromagnetic Phenomena in the Matter;
- Oscillations and
- Waves and Optics.

Purpose of the course:

The course in Physics for Engineers – II aims to provide knowledge about fundamental natural laws, electromagnetic and optic phenomena and basic Physical methods for investigations.

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.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

THEORETICAL ELECTRICAL ENGINEERING I

ECTS credits: 6	**Semester:** 2nd
Evaluation: written exam	**Hours per week:** 2 lectures+1 seminar exercise +1 laboratory exercise
Course type: lectures, seminar and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Prof.Eng. Galina Cherneva D.Sc e-mail: gcherneva@swu.bg
Ass.Eng. Maia Angelova PhD, e-mail: maia_angelova67@swu.bg
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Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62, fax: 0889871747, E-mail: technical_eea@swu.bg

Annotation:

The training in the discipline includes:

- basic elements, laws and methods for analysis of electrical circuits;
- established DC and sinusoidal modes in electrical circuits;
- circuits with mutual inductance;
- three-phase circuits.

Purpose of the course:

The aim of the course is to introduce students to fundamental laws of circuit analysis, DC and AC network analysis, equivalent transformations, etc.

Educational Methods:

Lectures, seminar and laboratory exercises.

Prerequisites: Basic knowledge of "Higher Mathematics" and "Engineering Physics I" is desirable.

Enrollment for training in the discipline: The course is studied by all students majoring in “Applied Electronic Systems”, as it is mandatory

Exam registration: The registration for the formation of the complex assessment is coordinated with the holder of the discipline, the leader of the laboratory and seminar exercises and the educational department.

FOREIGN LANGUAGE II

ECTS credits: 3	**Semester:** II
Evaluation: Written exam	**Hours per week:** 0 lectures + 2 seminar exercises + 0 laboratory exercises
Course type: Seminar exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: assist. prof. Bilyana Georgieva, PhD - bilianag@yahoo. com, bilianag@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 aim of the course „Foreign language - English" is to ensure the development of communication skills, reaching of certain phonetic, grammatical, lexical and thematic minimum, skills and habits for participation in real, communicative situations, knowledge and individual work with vocabulary. It aims to review and systematize the basic knowledge of the undergraduates and provides equal start level for the next stage of education, called "language of the programme". The choice of topics is based on their high particularly in the scientific style of speech and their unconditional structural significance and necessity of learning a foreign language. Widely used communicative exercises focus that strengthen the necessary grammatical habits and encourage students to be active speech activity in the studied subjects. The practical course is based on the thematic texts reflecting everyday student life, elementary special technical terminology on the subject and aims to stimulate the desire and motivation of students to enhance their language and consistent level - Elementary and Preintermediate. Course aim: The aim of the course is to build an initial communicative competence, as the ability to understand and draw meaningful oral and written statements, in accordance with the rules of the English language to develop reading skills and comprehension of texts from everyday communication and presentation and related texts the basic terms in the specialty; develop skills in technical vocabulary can make translations of technical texts from English into Bulgarian language using a dictionary.

Education Methods: Active methods are used through different exercises; based tests are made for control of the learned, translation of technical literature.

Inscribing for tuition:
The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.
Inscribing for exam:
Agreement with the lecturer and the Students Service Department.

CONSTRUCTING ELEMENTS IN ELECTRONICS

ECTS credits: 4	**Semester:** 2
Evaluation: Ongoing assessment	**Hours per week:** 2 + 0 + 1
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof., Eng. Valeri Vachkov, 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 is being taught using a video wall and multimedia. The necessary time for self study of the students is twice the number of the academic hours. The exercises are carried out in laboratory, equipped with specialized measurement devices. The exam is given to students, attending the laboratory practice, and it is in written form, consisting of two questions.

Purpose of the course:

By means of the subject “Semiconductor elements” the students get acquainted with basic elements of the physics of semiconductors and PN transition, composition, way of work, characteristics, parameters and equivalent elements schemes of semiconductors in discrete and chips application. Some typical applications are studied. The subject is a basic introductory subject in the electronics science and is studied after the courses in mathematics, physics, and electrical physics. It has basic relations to the consequent specialized courses in electronics, computer science and metrics.

Educational Methods:

The Course is taught in lecture halls together with the students from the major “Computer systems and technologies” in groups as usually the groups consist of 10 to 14 students. The students have individual independent tasks, make up presentations of the projected systems.

ELECTRICAL MEASUREMENTS

ECTS credits: 5 **Exam type**: written exam	**Semester**: **2** semester **Hours per week: 2+0+1** **Status of course:** Compulsory
Type of course: lectures and laboratory exercises	***Educational specialty:*** ***Applied electronics systems***

Lecturer: Associate Professor Doctor (PhD) engineer Uliana Paskaleva,
email: paskaleva_6@swu.bg ; uli_6@abv.bg
Assistant: PhD, engineer Maia Stoeva, maia_angelova67@swu.bg ;
Department: Department of Electrical Engineering, Electronics and Automatics
Faculty: Faculty of Engineering
Phone: 0896801893
Address: 2700, Blagoevgrad, Ivan Mihailov str. 66

Annotation

Aim 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.

Assessment: written final exam, two problem ssolving tests persemester

Registration for the Course: Compulsory without submitting an application

Registration for the Exam: coordinated withl ecture rand Student Service Department

MICROPROCESSOR TECHNIQUES

ECTS: 6	**Semester: 3**
Assessment: written final exam	**Hours per Week:** 2 + 0 + 2
CourseType: lectures and lab exercises	**Course Status:** mandatory
	Specialty: Applied Electronic Systems

Lecturers: Associate Professor Ljudmila Taneva, lucy_t@swu.bg
Assistant: Associate Professor Ljudmila Taneva, lucy_t@swu.bg
Department: "Electrical, electronic and automation", Technical Faculty, technical_eea@swu.bg, 2700 Blagoevgrad, Ivan Mihajlov str. № 66, Tel.073/88 51 63, fax: 0889871747, E-mail: technical_eea@swu.bg

Course Description:

The 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 teching, it is possible to carry out demonstrations to illustrate the lecture material.

Requirements/Prerequisites: basic knowledge of Computer Architecture and Programming C

Registration for the Course: no

Registration for the Exam: coordinated with lecturer and Student Services Department

MATHEMATICS FOR ENGINEERS - III

ECTS credits: 5	**Semester:** 3
Evaluation: Written exam	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: assoc. Prof. Vassil Grozdanov, PhD - vassgrozdanov@yahoo .com
Department: „Mathemathics",
Faculty: Natural Sciences and Mathematics Phone: (+359) 073 88 51 62
Assistant: Ass. Prof. Anka Markovska PhD - a markovska@iswu.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 on „Engeneering mathematics - III part" considers problems, related with the differential and integral calculation of functions of several variables, ordinary differential equations, Fourier series, integral of Fourier, transformation of Fourirer. Also the problems of the operating calculation will be considered. The course gives knowledge of the students that eill be necessary for studying many technical disciplines.

Course Aims: The aim of the course of „Engeneering mathematics - **III part"** is that the students to receive knowledge to solve problems on the teaching material. Also the students must work with the system "MatLab".

Educational methods: Lectures, exercises, individual work with scientific literature, textbooks work, individual problem solving and presentations.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

ANALOGUE ELECTRONIC

ECTS credits: 6	**Semester:** 3
Exam type: Written exam	**Hours per week: 2+0+2**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Eng. Vladimir Gebov, PhDe-mail: askon@swu.bg
Assistants: Head Assist. Prof., Eng. Emil Frenski, PhD, e-mail: emil_f@swu.bg
Department: "Electrical Engineering, Electronics and Automatics" 2700 Blagoevgrad, Ivan Mihajlov № 66, tel. 073/88 51 63 E-mail: technical_eea@swu.bg

Annotation:

The training course includes basic issues related to analogue electronics sheets, parts and related connections between them

The purpose of the course:

Students to acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of the electronic analogue sheets 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.

Prerequisites:

Basic knowledge of theoretical electrical engineering, electrical measurements and building blocks in electronics is desirable.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

THEORETICAL ELECTRICAL ENGINEERING II

ECTS credits: 4	**Semester:** 3th
Evaluation: ongoing assessment	**Hours per week:** 1 lectures+2 laboratory exercise
Course type: lectures, and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Prof.Eng. Galina Cherneva D.Sc e-mail: gcherneva@swu.bg
Ass.Eng. Maia Angelova PhD, e-mail: maia_angelova67@swu.bg
Department: "Electrical Engineering, Electronics and Automation"
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62, fax: 0889871747, E-mail: technical_eea@swu.bg

Annotation:

The training in the discipline includes:

- four-pole;
- periodic non-sinusoidal modes in electrical circuits;
- transients in linear electrical circuits;
- nonlinear electrical and electronic circuits.

Purpose of the course:

to give students basic knowledge for the study of periodic non-sinusoidal modes and transients in linear electrical circuits. The study of nonlinear elements is in view of their application in specific electronic devices and systems.

Educational Methods: Lectures and laboratory exercises.

Prerequisites: Basic knowledge of "Higher Mathematics" and "Theoretical Electrical Engineering I" is desirable.

Enrollment for training in the discipline: The course is studied by all students majoring in “Applied Electronic Systems”, as it is mandatory

Exam registration: The registration for the formation OF THE COMPLEX ASSESSMENT IS COORDINATED WITH THE HOLDER OF THE DISCIPLINE, THE LEADER OF THE LABORATORY AND SEMINAR EXERCISES AND THE EDUCATIONAL DEPARTMENT.

TECHNOLOGICAL PRACTICE I

CONSTRUCTING ELEMENTS IN ELECTRONICS

ECTS credits: 4	**Semester:** 3
Exam type: Ongoing assessment	**Hours per week:** 0+0+3
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof., Eng. Valeri Vachkov, PhD - v.vatchkov@,swu .bg
*Department:*Electrical Engineering, Electronics and Automatics – technical eea@swu.bg
Faculty: Faculty of Engineering - technical@swu.bg
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Phone: +359-73-88 51 62

Annotation:

Modern scientific and technological progress is inextricably linked with the development and development of new materials. It is the materials that have become the key link that determines the success of many engineering solutions in creating the most complex electronic equipment. Therefore, the study of electronic technology materials in universities is given a significant place, since specialists need knowledge about the laws of the behaviour of materials in various operating conditions.

The purpose of the course:

The purpose of the workshop "Constructing elements in electronics" is to develop knowledge and practical skills on the classification, purpose and application of materials and components of electronic equipment, the physical nature of the processes that determine the properties of materials, the technology for obtaining and methods for controlling their properties.

Educational methods:

Active methods are used by various exercises and practical classes; practical tests are conducted to control the knowledge and skills acquired.

Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

SIGNALS AND SYSTEMS

ECTS credits: 5	**Semester:** 3
Evaluation: Written exam	**Hours per week:** 2 + 0 + 1
Evaluation: current control, course work	**Discipline status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof., Eng. Filip Batalov, PhD - batalov@swu.bg
Assistant: Assistant Ivan Todorin, PhD - ivan todorin@swu.bg
Department: Communication and Computer Engineering – technical eea@swu.bg
Faculty: Faculty of Engineering - technical@swu .bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Status of the discipline into the Teaching plan: Obligatory discipline at the Bachelor teaching plans of the specialties Communication Technique and Technology, Electronics and Computer Systems and Technologies

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 nonperiodic 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.

The 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.

Prerequisites:

Basic knowledge of "Higher Mathematics", "Physics For Engineers" and "Theoretical Electrical Engineering " is desirable.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

DIGITAL ELECTRONIC

ECTS credits: 7	**Semester:** 4
Exam type: Written exam	**Hours per week: 2+0+2**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Eng. Vladimir Gebov, PhDe-mail: askon@swu.bg
Assistants: Head Assist. Prof., Eng. Emil Frenski, PhD, e-mail: emil_f@swu.bg
Department: "Electrical Engineering, Electronics and Automatics" 2700 Blagoevgrad, Ivan Mihajlov № 66, tel. 073/88 51 63 E-mail: technical_eea@swu.bg

Annotation:

The training course includes basic issues related to digital electronics sheets, parts and related connections between them

The purpose of the course:

Students to acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of the electronic digital sheets 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.

Prerequisites:

Basic knowledge of analogue electronics, electrical measurements and microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

POWER CONVERSION TECHNIQUES AND POWER SUPPLIES

ECTS credits: 7	**Semester:** 4
Evaluation: Written exam	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: ch. assistant 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.

The 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.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

FOREIGN LANGUAGE - III

ECTS credits: 3	**Semester:** 4
Evaluation: Ongoing assessment	**Hours per week:** 0 + 3 + 0
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assist. Prof. Bilyana Georgieva - bilianag@yahoo.com, bilianag@swu.bg
Department: Electrical Engineering, Electronics and Automatics – technical eea@swu.bg
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Annotation:

The aim of the course „Foreign language - English" is to ensure the development of communication skills, reaching of certain phonetic, grammatical, lexical and thematic minimum, skills and habits for participation in real, communicative situations, knowledge and individual work with vocabulary. It aims to review and systematize the basic knowledge of the undergraduates and provides equal start level for the next stage of education, called "language of the programme". The choice of topics is based on their high particularly in the scientific style of speech and their unconditional structural significance and necessity of learning a foreign language. Widely used communicative exercises focus that strengthen the necessary grammatical habits and encourage students to be active speech activity in the studied subjects. The practical course is based on the thematic texts reflecting everyday student life, elementary special technical terminology on the subject and aims to stimulate the desire and motivation of students to enhance their language and consistent level - Elementary and Preintermediate.

The purpose of the course:

The aim of the course is to build an initial communicative competence, as the ability to understand and draw meaningful oral and written statements, in accordance with the rules of the English language to develop reading skills and comprehension of texts from everyday communication and presentation and related texts the basic terms in the specialty; develop skills in technical vocabulary can make translations of technical texts from English into Bulgarian language using a dictionary.

Education Methods:

Active methods are used through different exercises; based tests are made for control of the learned, translation of technical literature.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

MEASUREMENTS IN ELECTRONICS

ECTS credits: 6	**Semester:** 4
Evaluation: Written exam	**Hours per week:** 2 + 0 + 2
Type of course: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Associate Professor Doctor (PhD) engineer Uliana Paskaleva

email: paskaleva_6@swu.bg ; uli_6@abv.bg

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Faculty: Faculty of Engineering - technical@swu .bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str. *Phone:* +359-73-88 51 62

Annotation:

Students acquire knowledge and practical skills to measure using different methods all parameters of signals and electronic and communication devices, calculations on the processing of measurement results and more.

Obtaining knowledge of specialized measurements of voltage, current, frequency, time, phase difference parameters of modulated signals, spectrum analysis of signals, microprocessor measurement instrumentation, basic concepts of intelligent measurement systems, virtual instrumentation.

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.

Assessment:

written final exam, two problem ssolving tests persemester

Registration for the Course:

Compulsory without submitting an application

Registration for the Exam: coordinated withl ecture rand Student Service Department

PROGRAMING - II

ECTS credits: 6	**Semester:** 4
Evaluation: Ongoing assessment	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Ivan Trenchev, PhD - trenchev@,swu .bg
Assistant: Assistant Ivan Todorin, PhD - ivan todorin@swu.bg
Department: Electrical Engineering, Electronics and Automatics - technical eea@swu.bg
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Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
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Annotation:

"Object-oriented programming (OOP) is a paradigm in computer programming in which a software system is modeled as a set of objects that interact with each other, as opposed to the traditional vision in which a program is a list of instructions that a computer executes. Each object is capable of receiving messages, processing data, and sending messages to other objects“ " - Wikipedia.

Purpose of the course:

Object-oriented programming is the main course for second-year students (fourth semester). The main goal of the course is to master the principles of object-oriented programming using the c++language.

At the beginning of the course, the main questions related to the definition and use of classes are recalled-encapsulation of data, member functions, constructor and destructor, objects of constants and constant members of the class, composition and objects as function parameters. The concepts of friendly functions and friendly classes are also introduced, such as static class articles.

Redefining operations is a basic method in object-oriented programming. The redefinition of unary and binary operations is illustrated by creating an Array class. Issues from class inheritance, virtual functions, and polymorphism are also studied in detail. Input and output streams for classes and objects, manual manipulators, thread states, threads, and working with files are part of the topics related to I / O operations in c++. The principles and methods of exception handling are considered: reporting, interception, redirection of processing, inheritance, and exceptions. After all, some classes of data structures are also studied.

Educational Methods:

Lectures and seminars.

Inscribing for tuition:

The course is studied by all students majoring in Applied Electronic Systems, as it is mandatory.

Inscribing for exam:

Agreement with the lecturer and the Students Service Department.

DESIGN OF ELECTRONICS EQUIPMENT

ECTS credits: 6	**Semester:** 5
Exam type: Written exam	**Hours per week: 2+0+2**
Type of course: lectures and laboratory exercises	**Discipline status:** Compulsory
	Degree Course: Applied electronic systems

Lecturer: Associate Professor Doctor (PhD) engineer Uliana Paskaleva

email: 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

Aim of the course:

At the end of the course students should gain knowledge on the general characteristics of the processes of design, construction and manufacture of electronic and communications equipment - process control, technology training, precision manufacture of electronic components and equipment, knowledge of main indicators of reliability of renewable and non-renewable electronic products, test methods for reliability, etc.

Educational Methods:

Lecture, demonstration, power point presentations, conversation, discussion, analysis of problems, laboratory measurements, laboratory test teamwork in the design of electronic assemblies. Use interactive methods of training and during lectures and laboratory exercises.

Assessment:

written final exam, two problem ssolving tests persemester

Registration for the Course:

Compulsory without submitting an application

Registration for the Exam:

coordinated withl ecture rand Student Service Department

TELECOMMUNICATION TECHNIQUES

ECTS credits: 6	**Semester:** 5
Evaluation: Written exam	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof., Eng. Gabriela Atanasova, PhD - gatanasova@swu .bg

Assistant: Assoc. Prof., Eng. Ivan Nedyalkov, PhD - i.nedqlkov@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 provides fundamental data on telecommunication systems, fundamental structure of telecommunication system, terminal equipment, telecommunication switching systems, telecommunication transmission systems. Services provided by telecommunication systems. The course offers also basic information about telecommunication networks.

Purpose of the course:

The aim of the course is introduce students to basic information about the contemporary state of telecommunication technology. It deals on a sufficient scale with fundamental structure of telecommunication system, terminal equipment, telecommunication switching systems, telecommunication transmission systems, services provided by telecommunication systems. The course offers also basic information about telecommunication networks - fixed and mobile networks, Intelligent Network (IN), Next Generation Networks (NGN).

Educational Methods:

Lectures and laboratory exercises.

Enrollment for training in the discipline:

The course is studied by all students majoring in “Applied Electronic Systems”, as it is mandatory

Exam registration:

The registration for the formation of the complex assessment is coordinated with the holder of the discipline, the leader of the laboratory and seminar exercises and the educational department.

ELECTRONIC DEVICES

FOR MEASURMENT AND CONTROL

ECTS credits: 6	**Semester:** 5
Exam type: Written exam	**Hours per week:** 2+0+2
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Eng. Vladimir Gebov, PhDe-mail: askon@swu.bg
Assistants: Assoc. Prof. Eng. Vladimir Gebov, PhD
Department: "Electrical Engineering, Electronics and Automatics"
2700 Blagoevgrad, Ivan Mihajlov № 66, tel. 073/88 51 63
E-mail: technical_eea@swu.bg

Annotation:

The training course includes basic issues related to cybernetics and automation systems, parts and related connections between them

The purpose of the course:

Students to acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of the automation systems 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.

Prerequisites:

Basic knowledge of analogue electronics, digital electronics and microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

INTERNET OF THINGS (IOT)

ECTS credits: 4	**Semester:** 5
Exam type: Written exam	**Hours per week:** 2+0+1
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. Dr. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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 academic discipline is devoted to the study of the principles of construction and functioning of telecommunications systems of the "Internet of Things" class, as well as the practical use of these systems in various sectors of the economy and spheres of human activity.

When studying an academic discipline, the following topics are considered:

- fundamentals and system architectures "Internet of things",
- leading players in the market of "Internet of things",
- Internet of things in various fields and industries,
- the technology of "Internet of things".

In the course of training, the emphasis is on a comprehensive and comprehensive development of these topics, which covers both technical and business aspects.

The purpose of the course:

The purpose of studying this discipline is to form students' initial skills in designing, developing and implementing Internet of Things systems.

Educational methods:

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

Prerequisites:

Basic knowledge of Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

PROGRAMMABLE LOGICAL CONTROLLERS

ECTS credits: 7	**Semester:** 6
Exam type: Written exam	**Hours per week: 2+0+3**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Eng. Vladimir Gebov, PhDe-mail: askon@swu.bg
Assistants: Assoc. Prof. Eng. Vladimir Gebov, PhD
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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 Programmable logical controllers (PLC), parts and related connections between them

The purpose of the course:

Students to acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of the PLC 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.

Prerequisites:

Basic knowledge of digital electronics and microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

SENSORS AND SENSOR NETWORKS

ECTS credits: 7	**Semester:** 6
Exam type: Written exam	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assist. Prof., Eng. Filip 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 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.

The 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.

Prerequisites:

Basic knowledge of digital electronics and microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

TECHNOLOGICAL PRACTICE II

CONSTRUCTION AND MANUFACTURE OF ELECTRONIC PRODUCTS

ECTS credits: 5	**Semester:** 6
Exam type: Ongoing assessment	**Hours per week:** 0+0+3
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assist. Prof. Dr. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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:

Technological practice in the direction of "Construction and manufacture of electronic products" is mandatory and covers topics related to the methods of design and construction of specific components of electronic and communication equipment, structural and technological methods for ensuring electromagnetic compatibility of electronic and communication equipment. Technologies for the manufacture of electronic and communication devices and their main components and elements are presented, using the knowledge gained in the study of physics, mathematics, electrical engineering, materials science, measurements in communications and other special disciplines. Topics related to the requirements for the design and technology of equipment, thermal conditions, analysis and control of technological processes, accuracy, stability, etc. are considered.

The purpose of the course:

At the end of the training course, students should gain knowledge about the general characteristics of technological processes in the production of electronic and communication devices-technological control, technological training, surface mounting technology. Acquire basic skills and knowledge of design of some specific nodes from electronic and communication equipment, to analyze parameters precision in the manufacture of electronic elements and instruments, reliability and others.

Educational methods:

Active methods are used by various exercises and practical classes; practical tests are conducted to control the knowledge and skills acquired.

Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

DATA TRANSFER AND COMPUTER COMMUNICATIONS

ECTS credits: 6	**Semester:** 6
Exam type: Written exam	**Hours per week: 2+0+2**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Filip Batalov, PhD e-mail: batalov@swu.bg
Assistants: Assist. Prof. Aneliya Stanoeva e-mail: anelia.vasileva@swu.bg
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: technical_eea@swu.bg
Faculty: Faculty of Engineering - technical@swu .bg
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Annotation:

An overview of the physical environment of systems and data transmission networks is given, methods of signal generation are described, a reference model of the relationship of open systems, and a logical structure of levels are presented. Methods of access to the channel in local networks are considered, examples of the organization of the physical Ethernet environment are given. Is an overview of the main protocols of distributed networks. The material is accompanied by a large number of illustrations.

The purpose of the course:

The purpose of studying this discipline is to:

- Give an introduction to the basic principles, methods, approaches to solving problems, and technologies of modern communication.
- To conduct a review of modern communication technologies, features of the construction of modern communication systems and networks (telecommunications).
- Create a theoretical and practical basis for setting and solving problems in the field of communication.
- Create a basis for interaction with specialists of various specialties in the design, development, and operation of communication systems and networks..

Educational methods:

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

Prerequisites:

Basic knowledge of Signals and systems, Analogue electronics, Digital electronics, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

EMBEDDED SYSTEMS

ECTS credits: 5	**Semester:** 6
Exam type: Written exam	**Hours per week: 2+0+1**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. Dr. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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 academic discipline is devoted to the development of software for embedded systems.

The course deals with:

- Organization of system and application software of embedded systems;
- Major paradigms and programming techniques for embedded systems;
- Hardware-dependent software;
- Embedded systems design tools software embedded systems;
- Debugging software, embedded systems;
- Programming embedded systems with micro power consumption;
- Technology re-use when building software for embedded systems.

The purpose of the course:

The purpose of the course "Embedded systems" is:

- Formation of an integrated approach to the issues of building real-time systems;
- Problems of embedded real-time systems;
- Study of the basic principles of building systems that ensure their high reactivity, reliability and predictability.

Educational methods:

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

Prerequisites:

Basic knowledge of Data transfer and computer communications, IoT, Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

TECHNOLOGICAL PRACTICE III

DIAGNOSTICS OF ELECTRONIC DEVICES

ECTS credits: 7	**Semester:** 7
Exam type: Ongoing assessment	**Hours per week:** 0+0+4
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assist. Prof. Dr. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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:

A long-term study of the problems of diagnostics of various objects allowed us to establish that there is a possibility of a quantitative description of the procedures for solving diagnostic problems and to find a number of search patterns. Then, methods and algorithms for constructing diagnostic programs were developed.

The purpose of the course:

The study of disciplines is aimed at the formation of knowledge of methods and methods of state control, troubleshooting in electronic systems and restoration of their performance. Practical skills are formed when performing a cycle of laboratory work.

Educational methods:

Active methods are used by various exercises and practical classes; practical tests are conducted to control the knowledge and skills acquired.

Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

CYBERSECURITY

ECTS credits: 7	**Semester:** 7
Exam type: Written exam	**Hours per week: 2+0+2**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. Dr. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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 development of the information society involves the introduction of information technologies in all spheres of life, but this also means the emergence of new security threats-from information leaks to cyberterrorism.

- The discipline "Cybersecurity" considers such issues as:
- The scope of activity in the information space;
- The security of the Internet and other telecommunications networks;
- Cybersecurity-as a set of conditions under which all components of cyberspace are protected from the maximum possible number of threats and impacts with undesirable consequences;
- Cultures of safe behavior in cyberspace.

The purpose of the course:

The purpose of the program is to form a general understanding of security in the information society and, on this basis, to form an understanding of information security technologies and the ability to apply cybersecurity rules in all areas of activity.

The tasks of the discipline include:

- Formation of general ideas about security in the information society;
- Describe the general principles of technologies used in information security;
- Instill the ability to apply the rules of cybersecurity in all areas of activity
- Mastering the knowledge that makes up the beginning of ideas about the information picture of the world and
- information processes;
- Mastering the ability to use computer technology as a practical tool for working with information in everyday life;
- The development of skills of orientation in the information flow.

Educational methods:

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

Prerequisites:

Basic knowledge of Data transfer and computer communications, IoT, Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

TECHNOLOGIES IN APPLIED ELECTRONIC SYSTEMS

ECTS credits: 7	**Semester:** 7
Exam type: Written exam	**Hours per week: 2+1+1**
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Filip Batalov, PhD e-mail: batalov@swu.bg
Assistants: Assist. Prof. Aneliya Stanoeva e-mail: anelia.vasileva@swu.bg
Department: "Electrical Engineering, Electronics and Automatics"
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Faculty: Faculty of Engineering - technical@swu .bg
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Annotation:

The working program of the discipline is developed on the basis of modern educational standards in the field of higher education in the direction of applied electronic systems. The discipline is a general professional, forming the basic level of knowledge for students in the specialty "Applied electronic systems".

The purpose of the course:

The goal of the program is to form students in the discipline, knowledge and skills in the following areas::

- Manufacturing technology and principles of operation of applied electronic systems and devices;
- Properties and features of operation of applied electronic systems and devices;
- Principles of functioning of the main components of applied electronic systems and devices;
- Peculiarities of the structure of applied electronic systems and devices;
- Elements of applied electronic systems and devices:
- Analog applied integrated systems: operating modes, parameters and characteristics, application features in the development of applied electronic systems and devices;
- Digital application integrated systems: operating modes, parameters and characteristics, application features in the development of applied electronic systems and devices.

Educational methods:

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

Prerequisites:

Basic knowledge of Data transfer and computer communications, IoT, Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

PROJECT IN DIGITAL ELECTRONIC

ECTS credits: 3	**Semester:** 5
Evaluation: Ongoing assessment	**Hours per week:** 0 + 0 + 2
Course type: Laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof., Eng. Vladimir Gebov, PhD - askon@swu. bg
Department: Electrical Engineering, Electronics and Automatics – technical eea@swu.bg
Assistant: Assist. Prof., Eng. Emil Frenski - emil f@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 training course includes basic issues related to digital electronics sheets, parts and related connections between them, with more practical goal.

Course aim:

Students to acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of the digital electronic, sheets and parts used in more popular provider in the world.

Educational Methods:

Individual work and scientific literature textbook exercises, brainstorming and discussion, work individually, solve problems, exercise, and Power Point presentation and written project on Microsoft Word.

PROJECT IN POWER CONVERSION TECHNIQUES

ECTS credits: 2	**Semester:** 5
Evaluation: Ongoing assessment	**Hours per week:** 0 + 0 + 2
Course type: Laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Ch. assistant 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 "Project in Power Conversion Technique" introduces students to the power supply and converter devices for power electronics and computers. Attention is drawn to the design of a particular power system, defined as individual task. Each student specific terms task with defined requirements and should then design a device meeting the requirements. The result is formed as coursework.Skills and habits to transfer knowledge into practice are obtained through the planned exercises, and also the ongoing monitoring of students' knowledge is conducted.

Course aim:

The aim of the course is to acquire knowledge and skills for the principles of operation, structure, and methodology of designing of the most common power supply and converter devices.

Educational Methods:

Laboratory exercises are conducted in a computer lab. Planned are frontal talks, dialogue with the active students and justifying their opinions in discussing and solving practical tasks. Prints of relevant theoretical parts and tasks inform students about topics of specific exercises and additional literature.

Requirements/Prerequisites:

Basic knowledge in Electrical Engineering, Components in Electronics, Analog Electronics.

Registration for the Course:

By request at the end of the 7 semester (the course is not obligatory).

Registration for the Exam:

Coordinated with the lecturer and Students Service Department.

WRITTEN AND SPOKEN CULTURE

ECTS credits: 2	**Semester:** 5
Evaluation: Ongoing assessment	**Hours per week:** 0 + 2 + 0
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assist. Prof. Bilyana Georgieva - bilianag@yahoo.com, bilianag@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 consists of 30 hours of seminar classes, and the number of hours for external tutoring is also 30.

The training is carried out according to the curriculum located in one module, which is a seminar. It includes a set of basic practical topics specially selected from the field of spelling and legal speech in the modern Bulgarian book language.

The teacher's responsibility is to ensure that each subsequent lesson sets the topic and the literature sources associated with it, and the student's responsibility is to prepare independently on the case studies of this topic in time for external tutoring.

The purpose of the course:

The aim of the course is to form the students ' ability to properly serve each other with the spelling and right-speaking rules in force in the modern Bulgarian book language. To form the students ' ability to explain the mechanism of the admittance of writing or legal inaccuracies and the reasons that led to it – the assimilational or dissimilational process, the dialectal influence, the so-called

Respect for the creative genius of the Bulgarian, embodied in the Bulgarian language.

Education Methods:

Active methods are used through different exercises; based tests are made for control of the learned, translation of technical literature.

Registration for the Course:

By request at the end of the current semester

Registration for the Exam:

Coordinated with lecturer and Student Service Department

WEB DESIGN

ECTS credits: 6	**Semester:** 5
Evaluation: Written exam	**Hours per week:** 2 lectures + 0 seminar exercises + 2 laboratory exercises
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. DrM. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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.

Course aim:

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.

Requirements/Prerequisites:

Basic knowledge in informatics.

Assessment:

Computer test , two problems solving tests per semester

Registration for the Course:

By request at the end of the current semester

Registration for the Exam:

Coordinated with lecturer and Student Service Department

APPLICATIONS FOR MOBILE OPERATION SYSTEMS

ECTS credits: 6	**Semester:** 5
Evaluation: Written exam	**Hours per week:** 1 lectures + 0 seminar exercises + 2 laboratory exercises
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. DrM. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: technical_eea@swu.bg
Faculty: Faculty of Engineering - technical@swu .bg
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Annotation:

The subject " Applications for mobile operation systems " focuses on gaining knowledge and skills in the field of Internet programming for mobile operating systems. The course covers the basic principles of programming with Java and some software packages for creating an applications for mobile OS. Students learn the basics of programming languages 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.

Course Aims:

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.

Requirements/Prerequisites:

Basic knowledge in informatics.

Assessment:

Computer test , two problems solving tests per semester

Registration for the Course:

By request at the end of the current semester

Registration for the Exam:

Coordinated with lecturer and Student Service Department

PROJECT DESIGN OF ELECTRONIC EQUIPMENT

ECTS credits: 3 **Exam type**: Current control	**Semester**: 7 - th semester **Hours per week: 0+0+2** **Status of course: elective**
Type of course: laboratory exercises	**Educational specialty:** Applied electronics systems

Lecturer: Associate Professor Doctor (PhD) engineer Uliana Paskaleva

Department: "Electrical Engineering, Electronics and Automatics"

e-mail: 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

Aim of the course:

At the end of the course students should acquire skills in the processes of design, development and manufacture of electronic and communications equipment - process control, training, technology, precision manufacturing of electronic components and equipment, knowledge of the main indicators of reliability of renewable and non-electronic products , methods for testing the reliability, etc.

Educational Methods:

Theory, methods for the design of electronic assemblies, calculations, discussions, problem analysis, laboratory measurements, laboratory test teamwork in the design of electronic modules. Use interactive teaching methods and during exercise.

Assessment:

Current control during the whole semester assignments.

Registration for the Course:

Coordinated with lecturer and Student Service Department

EMBEDDED COMPUTER SYSTEMS PROJECT

ECTS credits: 6	**Semester:** 7
Evaluation: Written exam	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. DrM. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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 discipline is part of the curriculum and includes 15 generalized topics in the field of programming with an emphasis on the features of embedded microprocessor systems. As a form of control during training, the current control and exam are provided. The content of the program covers the main issues related to the types of programming languages used in programming embedded microprocessor systems, algorithms for processing sequences of elements using arrays and loops, and much more.

In practical classes, students explore and apply the methods used during lectures, develop autonomous microprocessor devices .

Course Aims:

The aim of the course "Embedded Computer Systems Project" is for students to acquire knowledge for working with different software environments and for developing independent microprocessor devices. To get acquainted with the areas of application of microprocessor systems and the types of software environments for them. Students to acquire knowledge for application of modern programming methods and techniques in creating autonomous electronic devices.

Educational Methods:

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

Requirements/Prerequisites:

Basic knowledge in informatics.

Assessment:

Computer test , two problems solving tests per semester

Registration for the Course:

By request at the end of the current semester

Registration for the Exam:

Coordinated with lecturer and Student Service Department

PROJECT ON TECHNOLOGIES IN APPLIED ELECTRONIC SYSTEMS

ECTS credits: 6	**Semester:** 7
Evaluation: Written exam	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Filip Batalov, PhD e-mail: batalov@swu.bg

Assistants: Assist. Prof. Aneliya Stanoeva e-mail: anelia.vasileva@swu.bg

Department: "Electrical Engineering, Electronics and Automatics"

e-mail: 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 content of the program covers the main issues related to the tasks solved by the technologies in the applied electronic systems. Structure of the applied electronic systems, the automation of the separate stages in the development and operation of applied electronic systems, as well as the peculiarities of the technological processes for automated production and diagnostics of applied electronic systems..

Course aim:

Students acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of modern technologies in the field of applied electronic systems.

Educational Methods:

Individual work and scientific literature textbook exercises, brainstorming and discussion, work individually, solve problems, exercise, and Power Point presentation and written project on Microsoft Word.

Requirements/Prerequisites:

Basic knowledge in informatics.

Assessment:

Development of a course project on current themes of the discipline

Registration for the Course:

By request at the end of the current semester

Registration for the Exam:

Coordinated with lecturer and Student Service Department

BIOMEDICAL ELECTRONICS

ECTS credits: 6	**Semester:** 7
Exam type: Written exam	**Hours per week: 2+0+2**
Evaluation: current control, course work	**Discipline status:** Elective
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Filip Batalov, PhD e-mail: batalov@swu.bg
Assistants: Assist. Prof. Aneliya Stanoeva e-mail: anelia.vasileva@swu.bg
Department: "Electrical Engineering, Electronics and Automatics"
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Faculty: Faculty of Engineering - technical@swu .bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str. *Phone:* +359-73-88 51 62

Annotation:

In modern medicine very widely integrated the latest achievements of modern electronics. None medical office can not give up the use of electronic equipment and devices. Without knowledge of the basics of electronics, can not understand the working principles of modern medical apparatus. In this regard, the objective of this course is to acquaint students with the phenomena and technology underlying the structure and principles of operation of electronic devices used in medicine, their main blocks. To familiarize themselves with existing electronic medical devices and methods of treatment and prevention, in which they apply.

The purpose of the course:

The aim of the program is to form students trained in the discipline, knowledge and skills in the following areas:

- Fundamentals of information technology in medicine,
- Physical methods of diagnostics and research of biological systems,
- The device and principles of functioning of medical equipment.

Educational methods:

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

Prerequisites:

Basic knowledge of Data transfer and computer communications, IoT, Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

At the request of students at the end of the previous semester.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

BIOMEDICAL DATA MANAGEMENT INFORMATION SYSTEMS

ECTS credits: 6	**Semester:** 7
Exam type: Written exam	**Hours per week: 2+0+2**
Evaluation: current control, course work	**Discipline status:** Elective
	Degree Course: Applied electronic systems

Lecturer: Assoc. Prof. Filip Batalov, PhD e-mail: batalov@swu.bg
Assistants: Assist. Prof. Aneliya Stanoeva e-mail: anelia.vasileva@swu.bg
Department: "Electrical Engineering, Electronics and Automatics"
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Annotation:

To introduce students to the concept of modern medical informatics. The role of information in the life of a person and society. Content, form and presentation of medical information processing in medical information. Means and systems of registration and processing of biomedical information, information and computer technologies. The measurement information. Units of information measurement. The role of information and information processes in the field of medicine and healthcare.

The purpose of the course:

The aim of the program is to form students trained in the discipline, knowledge and skills in the following areas:

- Medical Informatics,
- Fundamentals of metrology in the field of medical and biometrics.
- General principles and methods of registration of biomedical information,
- Visualization in medicine.

Educational methods:

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

Prerequisites:

Basic knowledge of Data transfer and computer communications, IoT, Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

At the request of students at the end of the previous semester.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

COMPUTERIZED DEVICES AND SYSTEMS WORK IN REAL TIME

ECTS credits: 5	**Semester:** 8
Evaluation: : Ongoing assessment	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Compulsory
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. DrM. Venko Katsarov e-mail: v.katsarov@gmail.com
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Annotation:

Real-Time systems are becoming pervasive. Typical examples of realtime systems include Air Traffic Control Systems, Networked Multimedia Systems, Command Control Systems etc. In a Real-Time System the correctness of the system behavior depends not only on the logical results of the computations, but also on the physical instant at which these results are produced. Real-Time systems are classified from a number of viewpoints i.e. on factors outside the computer system and factors inside the computer system. Special emphasis is placed on hard and soft real-time systems. A missed deadline in hard real-time systems is catastrophic and in soft real-time systems it can lead to a significant loss. Hence predictability of the system behavior is the most important concern in these systems. Predictability is often achieved by either static or dynamic scheduling of real-time tasks to meet their deadlines. Static scheduling makes scheduling decisions at compile time and is offline. Dynamic scheduling is online and uses schedulabilty test to determine whether a set of tasks can meet their deadlines. The present paper talks about static and dynamic scheduling algorithms and operating systems support for these mechanisms.

The purpose of the course:

In the academic discipline, the basic functions of real-time measurement systems are considered. The purpose of the seminar exercises is to familiarize students with measurement systems that work in real time, and to publish the results on the line with the possibilities of ASP.NET and simulation of simulation systems through the rich capabilities of Matlab for working with real-time operation systems. Laboratory exercises are thematically related to the lecture material and allow you to acquire practical skills.

Educational methods:

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

Prerequisites:

Basic knowledge of Data transfer and computer communications, IoT, Programing, Telecommunication techniques and Microprocessor systems.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

AUTOMOTIVE ELECTRONICS

ECTS credits: 5	**Semester:** 8
Evaluation: Ongoing assessment	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: 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 "Automotive Electronics" acquaints students with basic electric and electronic systems in modern cars. The structure and principles of operation of the starting system, ignition system, electronic control of mixture formation, engine management systems, and electric chassis systems for comfort and safety are examined.There is also laboratory practicum through which, practical skills are obtained and the students' ongoing knowledge is monitored.

Course aims:

The aim of the course is to provide knowledge about the principles of operation and the structure of the main electrical and electronic systems in the car. Students acquire initial practical skills to be able to perform measurement, control, diagnostics and settings of the parameters, controlled by electronic systems.

Educational Methods:

Lectures are conducted in the classic way, students get acquainted consecutively with the provided material. The lectures are richly illustrated with graphic material presented on film or video projector. Laboratory exercises are conducted in a specialized laboratory in a separate garage.

Requirements/Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

At the request of students at the end of the previous semester.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

COMPUTER BASED AUTOMOTIVE DIAGNOSTIC SYSTEMS

ECTS credits: 5	**Semester:** 8
Evaluation: Ongoing assessment	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: 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 "Automotive Electronics" acquaints students with basic electric and electronic systems in modern cars. The structure and principles of operation of the starting system, ignition system, electronic control of mixture formation, engine management systems, and electric chassis systems for comfort and safety are examined. There is also laboratory practicum through which, practical skills are obtained and the students' ongoing knowledge is monitored.

Course aims:

The aim of the course is to provide knowledge about the principles of operation and the structure of the main electrical and electronic systems in the car. Students acquire initial practical skills to be able to perform measurement, control, diagnostics and settings of the parameters, controlled by electronic systems.

Educational Methods:

Lectures are conducted in the classic way, students get acquainted consecutively with the provided material. The lectures are richly illustrated with graphic material presented on film or video projector. Laboratory exercises are conducted in a specialized laboratory in a separate garage.

Requirements/Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

At the request of students at the end of the previous semester.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

RENEWABLE ENERGY SOURCES AND SYSTEMS

ECTS credits: 5	**Semester:** 8
Evaluation: : Ongoing assessment	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
Assistants: Assist. Prof. DrM. Venko Katsarov e-mail: v.katsarov@gmail.com
Department: "Electrical Engineering, Electronics and Automatics"
e-mail: 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 to the basic physical aspects and technology of renewable energy sources. The general energy resources of the Earth and the place of renewable energy sources in the overall energy balance, the physical and technical features of these sources, as well as some common problems of energy as the main branch of the economy are considered. Pay attention to the most important theoretical and practical problems related to the use, transfer and storage of energy from renewable sources, energy conservation and protection of the environment from harmful effects associated with energy production and consumption.

Course Aims:

The course aims to provide students, as part of their basic broad-based training, with specialized knowledge on the main problems of energy systems and renewable energy sources and solutions for the efficient use of energy.

Educational Methods:

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

Auxilary means for teaching:

Computer, development software, Internet and a tutorial for every laboratory theme.

Requirements/Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

At the request of students at the end of the previous semester.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

ELECTRONIC CONTROL DEVICES FOR ALTERNATIVE ENERGY SOURCES

ECTS credits: 5	**Semester:** 8
Evaluation: : Ongoing assessment	**Hours per week:** 2 + 0 + 2
Course type: Lectures and laboratory exercises	**Course status:** Elective
	Degree course: Applied electronic systems

Lecturer: Assoc. Prof. Anton Stoilov, PhD e-mail: astoilov@swu.bg
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Annotation:

The subject "Electronic control devices for alternative energy sources" focuses on gaining knowledge and skills in the field of alternative energy resources and control devices for installations utilizing this energy. The course covers the basic principles of work, management technologies and automation of renewable energy infrastructure and their connection with conventional energy. The laboratory work helps to better rationalization of lecture material and contribute to formation of practical skills.

Course Aims:

The course aims to provide students with knowledge of the principles of the electronic control devices for RES. They should be able to make assessments on the use of renewable energy and the necessary additional equipment for the management of energy resources

Educational Methods:

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

Auxilary means for teaching:

Computer, development software, Internet and a tutorial for every laboratory theme.

Requirements/Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

At the request of students at the end of the previous semester.

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.

PRE-GRADUATE PROJECT

ECTS credits: 6	**Semester:** 8
Exam type: Ongoing assessment	**Hours per week:** 0+0+1
Evaluation: current control, course work	**Discipline status:** mandatory
	Degree Course: Applied electronic systems

Lecturer: Assist. Prof. Dr. Venko Katsarov e-mail: v.katsarov@gmail.com
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Annotation:

In the course of studying the course "Pre-Graduate Project", the formation of the professional outlook of students continues on the basis of
the previously acquired knowledge and skills of designing electronic equipment, moral and aesthetic education, mastering professional skills at the level of modern requirements for specialists in the field of applied electronic systems, development and improvement of practical skills.

Develops search and constructive thinking and the ability to make informed decisions.

The knowledge, skills and abilities acquired in the course of training are systematized and will receive further professional development in the work on the diploma project.

The purpose of the course:

- Systematization of previously acquired knowledge and design skills for solving tasks;
- Mastering the skills of practical design;
- Perform the design of electronic equipment with the development of technical and technological documentation, design and design and production and technological solutions.

Educational methods:

Active methods are used by various exercises and practical classes; practical tests are conducted to control the knowledge and skills acquired.

Prerequisites:

Basic knowledge in Engineering Physics, Electrical Engineering, Components in Electronics, Electrical Measurements, Analog Electronics, Digital Electronics.

Enrolment for training in the discipline:

All students majoring in Applied Electronic Systems, as it is mandatory, study the course

Registration for the exam:

The registration for the formation of the complex current assessment is coordinated with the holder of the discipline, the leader of the laboratory exercises and the training department.