



SOUTH-WEST UNIVERSITY "NEOFIT RILSKI"

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**INFORMATION PACKAGE
/ECTS/**

FIELD OF HIGHER EDUCATION: 5. TECHNICAL SCIENCES

PROFESSIONAL FIELD: 5.2. ELECTRICAL ENGINEERING, ELECTRONICS AND
AUTOMATION

SPECIALITY: ELECTRONICS

EDUCATIONAL DEGREE: MASTER

LEVEL BY NATIONAL QUALIFICATION FRAMEWORK LEVEL 7

NUMBER OF CREDITS ON ESTS 60

QUALIFICATION: MASTER of ENGINEERING

DUARATION: ONE YEAR

FORM OF EDUCATION: FULL or PART TIME

ENTER FROM 2017/2018

DEGREE COURSE OF ELECTRONICS

First academic year			
First semester	ECTS credits	Second semester	ECTS credits
Embedded microprocessor systems design	6	Industrial communications networks	4
Security of industrial dates	6	<i>Elective of the second group</i>	4
Automated measurement and control systems	6	<i>Elective choice of third group</i>	4
<i>Elective of the first group</i>	6	English language	3
Theory of engineering experiment	6	<i>Diploma Thesis</i>	15
<i>Elective choice I</i>		<i>Elective choice II</i>	
<i>Integrated computer systems and networks</i>		<i>Intelligent sensors and actuators</i>	
<i>Certification of electronic manufacturing</i>		<i>Programming embedded microprocessor systems</i>	
		<i>Elective choice III</i>	
		<i>Electronic analog devices with digital control</i>	
		<i>Dynamic web applications</i>	
	Total:30		Total:30

TOTAL: 60 CREDITS FOR ONE ACADEMIC YEARS

ANNOTATION OF COURSES

EMBEDDED MICROPROCESSOR SYSTEMS DESIGN

ECTS credits: 6	Semester: I
Evaluation: written exam	Hours per week: 2 lectures+2 laboratory exercises
Course type: Lectures +Laboratory exercises	Course status: Compulsory
	Degree course: Electronics

Lecturers: Assoc. Prof. Eng. Lyudmila Rumenova Taneva, PhD – lusy_t@swu.bg
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Course Description: The "Embedded Microprocessor Systems" course aims to familiarize the students with the theory in the construction of embedded microprocessor systems for the industry. Topics include the classical design methods as well as the technical means and methods for transmitting and processing information. Included are some of the most popular microprocessor families, various multifunctional elements and the basic principles of their software.

Course Aims:

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

Teaching Methods: lectures and laboratory. The course is held in lecture with multimedia. The exercises are held in groups; usually groups are composed of 10 to 12 students.

Requirements/Prerequisites: Students should have knowledge and skills in computer systems, technical devices, communication networks, can install software to work with application software.

SECURITY OF INDUSTRIAL DATES

ECTS credits: 6	Semester: I
Evaluation: written exam	Hours per week: 2 lectures+2 laboratory exercises
Course type: Lectures +Laboratory exercises	Course status: Compulsory
	Degree course: Electronics

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Course Description: The purpose of the course "Security of industrial data" is students to acquire knowledge about the legal framework of goals, objectives, technical devices of which building industrial systems, the relationship between different levels of communication in the industrial company, technology and various techniques acceptance transmission and processing of industrial data. Students to learn about possible cyber-attacks in the industry, their ways of realization, to study methods of counteraction them. Be aware of the latest trends for countering cyber-attacks and security methods for transmitting industrial data. To know the various implementations of these methods united the opportunity to inform in an attack by a different way of communication.

Course Aims: To acquire the ability for optimum choice of technical means to build video surveillance systems, security and monitoring. To develop and offer new, creative options for making use of technical means security. Individually or in teams to design and build security systems, video surveillance and monitoring.

Teaching Methods: lectures and laboratory. The course is held in lecture halls together with students of "Computer Systems and Technologies" and "Communication Engineering". The exercises held in groups; usually groups are composed of 10 to 14 students.

Requirements/Prerequisites: Students should have knowledge and skills in computer systems, technical devices building industrial systems, communication networks, can install software to work with application software.

AUTOMATED SYSTEMS OF MEASUREMENT AND CONTROL

ECTS credits: 6	Semester: I
Evaluation: written exam	Hours per week: 2 lectures+2 laboratory exercises
Course type: Lectures +Laboratory exercises	Course status: Compulsory
	Degree course: Electronics

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Course Description: The subject "Automated Systems of Measurement and Control" aims at acquainting students of Master's degree in Electronics with questions related to the architecture and application of microprocessor measurement systems. Which solve the problems, which Occur in the complex automation of production and in conducting complex scientific and technical studies at long distances by the user of the measurement information. The main structural principles, the necessary hardware and software for a wide range of devices considered: intelligent sensors, measuring instruments, measuring systems, etc. New algorithms of function oriented to improve the metrological characteristics of the measuring instruments analyzed. Attention drawn to the interface components and the principles of the interface technique. The individual themes illustrated with modern technical solutions, some of which used in practical and theoretical exercises to the discipline.

Course Aims: At the end of the training course, thanks to the topics of the lectures and laboratory exercises, the students develop practical habits and skills for acquiring more in-depth experience and knowledge in the field of automated measurements. Students familiarized with microprocessor measuring instruments and the basic principles and regulations for creating virtual measuring devices.

Teaching methods: The lectures conducted in the traditional way and the students are acquainted with the topics. Problem issues discussed if necessary. There is a dialogue with prominent students.

THEORY OF ENGINEERING EXPERIMENT

ECTS credits: 6	Semester: I
Evaluation: written exam	Hours per week: 2 lectures+2 laboratory exercises
Course type: lectures +laboratory exercises	Course status: Compulsory
	Degree course: Electronics

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Annotation:

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

Purpose of the course:

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

Educational Methods:

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

Inscribing for tuition: Not necessary.

Inscribing for exam: Agreement with the lecturer and the Students Service Department

INTEGRATED COMPUTER SYSTEMS AND NETWORKS

ECTS credits: 6	Semester: I
Evaluation: written exam	Hours per week: 2 lectures+2 laboratory exercises
Course type: lectures +laboratory exercises	Course status: Elective
	Degree course: Electronics

Lecturer: Assist. prof. Eng. Filip Atanasov Tsvetanov, PhD.- ftsvetanov@swu.bg
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Course Description: The course "Integrated Computer Systems and Networks" aims to give students theoretical and practical knowledge and skills on the basic principles, methods and tools for building of integrated computer systems and networks, processing and transmission of data, sound And images, as well as the possibilities for using them.

Course Aims: The aim of the course is to acquire knowledge about the necessity of building integrated computer systems, requirements in the design and construction of the structure of the integrated computer systems, the specific features of these networks and problems of the integrated Data transmission networks, sound and images; Computer animation packages, digital speech digitization methods, etc. Students also introduced to the impact of the latest information technology in the development of computer networks, such as cloud technologies, data centers, the Internet of Things.

Training methods: The course held in lecture halls jointly with the students of the specialties, and 10 groups of students conduct the exercises.

CERTIFICATION OF ELECTRONIC MANUFACTURING

ECTS credits: 6	Semester: I
Evaluation: written exam	Hours per week: 2 lectures+2 laboratory exercises
Course type: lectures +laboratory exercises	Course status: Elective
	Degree course: Electronics

Lecturer: Assoc. Prof. Valeri Vachkov, Ph.D. – v.vatchkov@swu.bg

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Course description: The course aims at studying the main aspects of the certification processes, the means and methods of different types of certificates, the legal aspects of certification and accreditation. The main tasks of the course are to master students in the organizational-methodological, scientific and technical basis of the certification processes, without the knowledge of which it is impossible to ensure the accuracy, authenticity of the certification tests. They will become acquainted with the RoNS, directive which complements the other WEEE Directive, which deals with the secondary use of equipment and materials after the treatment of lead, tellurium and others. In addition, they will gain insight into international cooperation in the field of standardization, metrology, product quality and service management.

Course Aims: The aim of the course "Certification of Electronic Production" is to acquaint students with the main aspects of the certification process, the means and methods of elaboration of different types of certifications, legal aspects of certification and accreditation.

Teaching methods: The lectures conducted in the classical way and the students are acquainted with the material. Interactive training methods envisaged. The lectures richly illustrated with graphic material, which presented with a video projector. The visualization of the exhibited material allows students to receive visual and tactile information.

INDUSTRIAL COMMUNICATIONS NETWORKS

ECTS credits: 4	Semester: II
Evaluation: written exam	Hours per week: 2 lectures+1 laboratory exercises
Course type: lectures +laboratory exercises	Course status: Compulsory
	Degree course: Electronics

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Course Description: The course "Industrial communication networks" introduces students to the general characteristics of network communications in industrial environments, network topologies and methods of access to the physical environment, communication mechanisms in industrial networks. Discussed are most applicable specifications in industrial conditions of these networks and their components and specific features in their industrial implementation. Emphasis is on the correct choice of type of communication, components, and network configuration, choice of components and construction and study of application software for the industrial network.

Course Aims: Purpose of the course is that students gain theoretical knowledge and practical skills and competencies most appropriate choice of protocol for the construction of industrial network design and industrial network with the selected protocol. Systematization of this knowledge allows passing to be acquainted with the methodology of their use.

Teaching Methods: The course is held in multimedia lecture halls. Practical exercises conducted in groups; usually groups made up to 10 students.

Requirements/Prerequisites: Students should have knowledge and skills on the technical means building industrial systems, communication networks, can install software to work with application software.

INTELLIGENT SENSORS AND ACTUATORS

ECTS credits: 4	Semester: II
Evaluation: written exam	Hours per week: 1 lectures+2 laboratory exercises
Course type: lectures +laboratory exercises	Course status: Elective
	Degree course: Electronics

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Course Description: The course on "Intelligent sensors and actuators" introduces students to the nature, structure, characteristics of the installation and testing of advanced intelligent sensors and devices specifics of micro sensors. Discussed are their characteristics for use in various electronic and communication devices and systems, methods of theoretical analysis and experimental study of sensors. Systematization of this knowledge allows passing to be acquainted with the methodology of their use.

Course Aims: The purpose of the course "Intelligent sensors and actuators" students is to acquire theoretical knowledge and practical skills and competencies for selecting the most cost-effective sensor and actuator depending on solving specific engineering problems and apply the sensors in various electronic and communication devices for automatic control, alarm, video security, video monitoring, management and control of technological variables and parameters and others.

Teaching Methods: The course is held in lecture halls equipped with multimedia device. The exercises held in groups; usually groups are composed of 10 to 14 students.

Requirements/Prerequisites: Students should have knowledge and skills in computer systems, technical devices building industrial systems, communication networks, can install software to work with application software.

PROGRAMMING EMBEDDED MICROPROCESSOR SYSTEMS

ECTS credits: 4	Semester: II
Evaluation: Written exam	Hours per week: 1 lectures+2 laboratory exercises
Course type: Lectures +Laboratory exercises	Course status: Elective
	Degree course: Electronics

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Course description: The "Programming Embedded Microprocessor Systems" includes 15 general themes in the programming area, focusing on the features of the embedded microprocessor systems. As a form of control in the course of study, there is a requirement for current control and examination. The content of the program covers the main issues related to the types of programming languages used in the programming of embedded microprocessor systems, algorithms for processing arrays of elements using arrays and cycles. The successful exam of "Embedded Microprocessor Systems Programming" will acquire the necessary knowledge of applying advanced technologies and methods for creating a finished product - a computerized device based on a microprocessor system. At the practical classes, students study and apply the methods used during the lectures and make independent microprocessor devices.

Course Aims: The aim of the course "Programming Embedded Microprocessor Systems" is to acquire knowledge of working with different programming environments and to develop independent microprocessor devices. To familiarize with the application areas of the microprocessor systems and the types of programming environments for them. Students acquire knowledge about the application of modern programming methods and techniques in creating autonomous electronic devices.

Teaching methods: The lectures based on pre-developed presentations with a multimedia projector. Each lecture accompanied by practical examples and tasks that solved in class. Throughout the lecture, an interactive dialogue with students maintained through control questions and answers. Discussion held at the end of the lecture on the new material.

Practical exercises held in a computer lab equipped with the required number of workstations. Each student provided with a stand-alone workplace and a computer configuration with pre-installed all necessary software and hardware products. At the end of the practical exercise, each student uploads the decision of the particular task solved during the exercise.

ELECTRONIC ANALOG DEVICES WITH DIGITAL CONTROL

ECTS credits: 4	Semester: II
Evaluation: Written exam	Hours per week: 1 lectures+2 laboratory exercises
Course type: Lectures +Laboratory exercises	Course status: Elective
	Degree course: Electronics

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Описание на дисциплината: Дисциплината “Електронни аналогови устройства с цифрово управление” е избираема за студентите в II семестър. Целта на курса е студентите да получат необходимите знания и умения за приложението на електронните схеми, устройства и уреди за контрол, измерване и управление на величини и параметри, участващи в технологични и производствени процеси. Представени са аналогови и цифрови средства за автоматизация. Посочени са конкретни примери на програмируеми с микропроцесори електронни схеми и устройства, програмируеми логически контролери (PLC). Лабораторните упражнения затвърждават и разширяват получените по време на лекциите знания и целят студентите да привикнат към практическо използване на придобитите теоретични познания и резултати.

Цел на дисциплината: Целта на курса е студентите да получат необходимите знания и умения за приложението на електронните схеми, устройства и уреди за контрол, измерване и управление на величини и параметри, участващи в технологични и производствени процеси. Представени са аналогови и цифрови средства за автоматизация.

Методи на обучение: Лекциите се провеждат по класическия начин като студентите се запознават последователно с предвидения материал. Предвиждат се фронтални въпроси, диалог с по-активните студенти и аргументиране на техните становища. Те са богато илюстрирани с графичен материал, който се представя с видео проектор или на фолио, предварително разработен материал на Power point.

Практическите упражнения се провеждат в компютърна лаборатория, снабдена с персонални компютри и инсталиран софтуерен пакет на MSOffice и MicroWin, WinCCflexible. Всеки студент работи на самостоятелно работно място и изпълнява практическите задачи, предварително дискутирани и описани в методически указания от асистента.

DYNAMIC WEB APPLICATIONS

ECTS credits: 4	Semester: II
Evaluation: Written exam	Hours per week: 1 lectures+2 laboratory exercises
Course type: Lectures +Laboratory exercises	Course status: Elective
	Degree course: Electronics

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Annotation: The subject "Web design" focuses on gaining knowledge and skills in the field of Internet programming. The course covers the basic principles of programming with HTML and some software packages for creating WEB sites. Students learn the basics of programming languages PHP, Java and Java Script and the use of database applications for the Internet. The laboratory work helps to better rationalization of lecture material and contribute to formation of practical skills.

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

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