

DESCRIPTION OF THE COURSE

Name of the course: Power supplies	Code: BpES01	Semester: 5
Type of teaching: Lectures(L) Tutorials (T) Laboratory work (LW)	Hours per semester: L – 30hours T– 15 hours LW – 20 hours	Number of credits: 6
Course project (CP)	Code: BpES07	Number of credits: 2

Prof. Eng. Tsvetana Grigorova, PhD (FEA), tel.: 032 659 711, e-mail: c_gr@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: [Facultative subject from the curriculum obtain Master’s degree, specialty “Design and programming of electronic systems” Professional orientation 5.2 Electrical engineering, electronics and automation, Field 5 Technical Sciences.]

AIMS AND OBJECTIVES OF THE COURSE: The course "Power supplies" aims to teach students the principles of operation and methods for designing basic circuits of electronic power supplies and power sources. Students gain practical experience in studying rectifiers, continuous voltage and current regulators, switch mode converters, batteries, and other power sources.

DESCRIPTION OF THE COURSE: Parameters and characteristics of basic circuits of power supplies and converters of electrical energy are considered - rectifiers, DC voltage and current regulators with continuous operation, switch mode converters, batteries and other energy sources. Students are also introduced to operating principles and features of uninterruptible power supply systems. The course focuses on acquiring knowledge related to analysis and design methods through simulation programs and models - PSpice for TI and PLECS. A course project is also included to design a power supply device for a specific assignment.

PREREQUISITES Required knowledge in disciplines: Electrical engineering, Semiconductor devices, Electronic circuits theory, Analogue electronics, Digital electronics.

TEACHING METHODS: Lectures using slides, lab exercises with protocols and simulation software tools: PSpice for TI, PLECS with description and defense.

METHOD OF ASSESSMENT: The course grade is formed by considering the grade of the written exam (80%) and the defense of the laboratory exercise protocols (20%). The examination consists of written answers to 3 to 5 set problems, case studies, or assignments that productively test the student's knowledge and skills. The course project is an independent assessment.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Стефанов Н., “Токозахранващи устройства”, Техника, С., 2010.; 2. Арнаудов Д., Ст. Денчев, Г. Гигов, “Ръководство за лабораторни упражнения по ТЗУ” ТУ-София, 2014.; 3. Стефанов Н., Д. Дечев, “Ръководство за лабораторни упражнения по ТЗУ”, Печатна база ТУ-София, 1994.; 4. Стефанов Н., “Ръководство за проектиране на ТЗУ”, Печатна база ТУ-София, 1994.; 5. Браун М., “Наръчник по токозахранващи устройства”, Техника, С., 1998.; 6. Анчев М., М. Минчев “Системи за непрекъсваемо електрическо захранване” С., Авангард, 2006.; 7. Юдов, Д., В. Вълчев, “Токозахранващи устройства”, Варна, ТУ Варна и БСУ, 2008. ISBN 978- 954-9370-57-7; 8. www.onsemi.com “Switch Mode Power Supply” — Reference manual 2002.; 9. www.onsemi.com “Power Factor Corection” — Handbook 2004

DESCRIPTION OF THE COURSE

Name of the course: Circuitry for impulse and mixed signals	Code: BpES02	Semester: 5
Type of teaching: Lectures (L) Seminar work (SW) Laboratory work (LW)	Hours per semester: L – 30 hours SW – 10 hours LW – 20 hours	Number of credits: 5

LECTURER:

Assist. Prof. Eng., Iliya Petrov, PhD (FEA), tel.: 032/659 718, e-mail: ilpetrov@tu-plovdiv.bg

Technical University - Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Design and Programming of Electronic Systems, Professional orientation 5.2. Electrical engineering electronics and Automation, Field 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students will have knowledge about methods and means for obtaining, converting, and selecting of impulse and mixed signals. They will be acquainted with analysis and synthesis of impulse circuits and converters of mixed signals, as well as their application fields.

DESCRIPTION OF THE COURSE: The course is fundamental for knowledge and skills in the field of analysis and design of impulse circuits and devices for A/D and D/A conversion. The study material comprises questions about working principle of the schemes, analysis of transient period and connected with it time of pulses and pauses, the different kinds of impulse circuits and design approaches. The student will have knowledge about application fields of impulse circuits and converters of mixed signals too.

PREREQUISITES: Theory of Electrical Engineering I, Analog electronics, Electronic circuits theory, Digital Electronics, Signals and Systems.

TEACHING METHODS: The lectures are conducted basically traditionally by writing on a whiteboard. By means of multimedia projector are shown big schematics and internal structures of integrated circuits. For a great number of lectures, study material is made in an electronic way. On tutorials are solved practical problems.

METHOD OF ASSESSMENT: Two two-hour assessments at the mid and at the end of semester (40% each), laboratories (20%).

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.Кокеров Г., Импулсна схемотехника, Изд. на ТУ-София, София, 2006; 2.Димитрова М., Ив. Ванков, Импулсни схеми и устройства, ч.1 и 2, Техника, София, 1989; 3.Вълков Ст., Аналогова електроника, Техника, София, 2002; 4.Михов Г., Цифрова схемотехника, Изд. на ТУ-София, София, 2008; 4.Конов К., Импулсни и цифрови схеми с интегрални TTL елементи, ч.1 и 2, Техника, София, 1982, 1983; 5.Horowitz P., W. Hill, The Art of Electronics, 3rd Ed., Cambridge University Press, 2015; 6.Трейстер Р., Радиолобительские схемы на ИС типа 555, Мир, Москва, 1988; 7.Вълков Ст., Импулсна техника, София, Техника, 1992.

DESCRIPTION OF THE COURSE

Name of the course: Programming III	Code: BpES03	Semester: 5
Type of teaching: Lectures(L) Tutorials (T) Course work (CW)	Hours per semester: L – 30 hours Tutorials – 30 hours	Number of credits: 5

LECTURER:

Assist. Prof. Eng., Iliya Petrov, PhD (FEA), tel.: 032/659 718, e-mail: ilpetrov@tu-plovdiv.bg

Technical University - Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Design and Programming of Electronic Systems, Professional orientation 5.2. Electrical Engineering, Electronics and Automation, Field 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students will be acquainted with peculiarities of the syntax and the construction of programming code in Python language, basic operations, keywords, build-in functions, data types, control operators (for branching and for cycles). The students will be able to design applications with graphical user interface.

DESCRIPTION OF THE COURSE: Main topics: Development environments for Python. Syntax of Python language. Keywords. Variables. Operations and statements: arithmetic, assignment operations, comparison operations, logical and bitwise operations, membership and identity operations. Data types in Python language. Numerical types and operations with them. Working with strings in Python. Sequence types: list, tuple, and range. For cycle in Python. Operator for conditional branching. One and two-dimensional arrays. Dictionary type. Comprehensions in Python. Working with files in Python. Processing CSV files and parsing of XML documents. Functions. Graphical user interfaces (GUI), using graphical components: Label, Entry, Button, Frame, Combobox, Listbox, Scale, Checkbutton, and Radiobutton. Working with images, graphics, and standard parametric shapes. Implementing animation. Creating and using classes and objects.

PREREQUISITES: Programming I, Programming II, Mathematics I, Mathematics II.

TEACHING METHODS: Lectures by writing on a whiteboard and multimedia projector with language interpreter where the programming code is demonstrated, tutorials on basic topics on lectures, including solution of particular problems and course work with description and defense.

METHOD OF ASSESSMENT: Exam (70%), tutorials (10%), course work (20%).

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.Василев Ал., Python - основи на езика в примери, Асеновци, 2021. 2.Василев Ал., Python - разширени възможности на езика в примери, Асеновци, 2021. 3.D. K. Academy, Python - решения на практически задачи, Асеновци, 2018. 4.Mark Lutz, Learning Python, 5th Edition, O'Reilly, 2013. 5.Paul Jones, Python: The Fundamentals of Python Programming, 2016. 6.Kent D. Lee, Steve Hubbard, Data Structures and Algorithms in Python, Springer, 2015. 7.Nicholas H. Tollervey, Programming with MicroPython: Embedded Programming with Microcontrollers and Python, 2nd Edition, O'Reilly, 2018.

DESCRIPTION OF THE COURSE

Name of the course: Quality and Reliability in Electronics	Code: BpES04	Semester: 5
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T)	Hours per semester: L – 30 hours T –15 hours LW – 10 hours	Number of credits: 5

LECTURER(S):

Assoc. Prof. Eng. Boryana Pachedjieva, PhD (FEA), tel.: 659708, e-mail: pachedjieva@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical engineering, electronics and automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students should be able to apply the approaches and technical means to ensure the quality and reliability of electronic products; perform statistical quality control as well as the data collection for quality and reliability evaluation and use them in solving different engineering tasks.

DESCRIPTION OF THE COURSE: The main topics concern: Quality and reliability indicators, quality management systems, statistical methods for quality control of electronic products, assurance of the quality of the products throughout the life cycle: design, development and mass production of the products, testing methods of reliability by applying different probability laws.

PREREQUISITES: Mathematics I - III.

TEACHING METHODS: Lectures, using slides, laboratory work, work in teams, protocols description preparation and defence.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (70%), laboratories (10%), course work (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1.Stefanova, K, S.Stefanov, B. Pachedjieva. Guidelines for laboratory and seminars on quality and reliability of electronic equipment. TUS,2017 (in Bulgarian). 2. Andonova A., Ph. Philippov,A, Testing and reliability of microelectronic devices, TUS,1998 (in Bulgarian); 3. Andonova A. et al., Guidelines for laboratory and seminars on quality and reliability of electronic equipment, TUS,2008 (in Bulgarian). 4. Birolini A., Reliability Engineering, Berlin, Springer, 2004. 5. Krishnaiah P. R., C. R. Rao, Quality and Reliability, John Wiley & Sons, 2004. 6. Chan A., P. Englert, Accelerated Stress Testing Handbook, New York, IEEE Press, 2001.

DESCRIPTION OF THE COURSE

Name of the course: Measurements in electronics	Code: BpES05	Semester: 5
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: 5

LECTURER:

Assist. Prof. Eng. Rossen Bozhilov, PhD (FEA), e-mail: rossen_chi@abv.bg
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COURSE STATUS IN THE CURRICULUM:

AIMS AND OBJECTIVES OF THE COURSE: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

DESCRIPTION OF THE COURSE: Standards, errors and uncertainty, system configuration, measurement of analog and digital quantities, static characteristics, dynamic characteristics, current and voltage measurement, compensating techniques, analog and digital oscilloscopes, basic sensors, computer-based measuring systems and virtual equipment. Methods and means for measuring communication signals. Parameters and characteristics of measurement hardware.

PREREQUISITES: Electrical Engineering, Semiconductor Devices, Signals and Systems, Analogue electronics, Electrical measurements

TEACHING METHODS: Lectures, using slides, case studies, laboratory work, work in teams, protocols description preparation and defence.

METHOD OF ASSESSMENT: Written exam at the end of the semester (80%), laboratories (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Стоянов, Ив., Електронни измервателни системи, Технически университет – София, София 2012г.; 2 Арнаудов Р., Р. Динов. Измервания в комуникациите. ТУ - София, 2005 г.; 3. John Wiley & Sons, Fundamentals of Instrumentation and Measurement, Dominique Placko 2010 4. Alan S. Morris, Reza Langari, Measurement and Instrumentation: Theory and Application, ELSEVIER 2012.

DESCRIPTION OF THE COURSE

Name of the course: Practicum	Code: BpES06	Semester: 5
Type of teaching: Lectures (L) Laboratory work (LW)/Tutorials (T) Course work (CW Non-Auditorium Study (NA))	Hours per semester: L – 0 hours T – 0 hours LW – 0 hours NA – 60 hours	Number of credits: 2
Course project (CP)		

LECTURER:

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COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The "Practicum" course is aimed at providing the students with practical knowledge, experience and skills for their future work. The students consolidate their knowledge obtained from basic disciplines by means of the preliminary analysis and calculation of the circuits. On the other hand, they receive a general perception about the theoretical electronic schemes (circuits) and their practical realization.

DESCRIPTION OF THE COURSE: Experimental laboratory work, in an non-auditorium environment, lasting one semester is carried out on simple but diverse electronic circuits on the basis of the knowledge acquired so far on analog and digital circuitry. The considered circuits are subjected to preliminary Spice analysis and calculation and are then assembled and activated. The obtained results from the measurements are compared with the calculated ones. In this way the students are able to understand eventual mistakes and can correct and avoid them. The considered topics are directly related to the profile of the specialties.

PREREQUISITES: Electrotechnical materials, Programming, Theoretical Electrical Engineering, Electrical Measurements, Programming, Semiconductor Elements, Theory of Electronic Circuits, Analog Circuitry, Digital Circuitry, Electromechanical Systems, Power Supplies and energy sources, Impulse circuitry and devices.

TEACHING METHODS: Non-Auditorium classes with a practical focus.

METHOD OF ASSESSMENT: The form of control is through the assessment "Confirmed course"

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Towers, Thomas, Transistor Selector, Technica press, Sofia 1998.; 2. Zlatarov V. Donevski at al. "Analog electronic circuits and systems", Technica Publishing House, Sofia 1995.; 3. Konov K., Pulse and digital circuits with integral TTL elements, I and II part, Technica press, Sofia 1998.; 4. Clayton G., Operational Amplifiers, Technica press, Sofia 2002.

DESCRIPTION OF THE COURSE

Name of the course: Sport	Code: SPR05	Semester: 5
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Self-Study (SS)	Hours per semester: L – 0 hours S – 0 hours SS – 30 hours	Number of credits: 1

LECTURER(S):

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Sen.Lect. Petar Doganov, PhD (FEA), tel.: 032 659 648, e-mail: pdoganov@tu-plovdiv.bg

Sen.Lect. Boris Spasov, PhD (FEA), tel.: 032 659 647, e-mail: boris_spasov@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curriculum for training of students to obtain Bachelor's degree, specialty “Automation, Information and Control Systems”, “Electrical Engineering”, “Design and programming of electronic systems” Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Targeted at further developing of students’ physical activities, skills and hygiene habits through effective methods of physical education, improving their mental and physical performance.

DESCRIPTION OF THE COURSE: The knowledge and skills in Physical Education and Sports develop a wide range of motor skills and habits, help the hardening of the body and contribute to the moral development of students. The enhancement of physical skills is carried out through:

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.
2. Sports-Specific Physical Preparedness (SPP) – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curricula presume the minimum of knowledge and skills acquired at secondary school.

TEACHING METHODS: Seminars in accordance with the curriculum in PE and Sport.

METHOD OF ASSESSMENT: Evaluation is based on functional tests at the end of semester. Lecturer’s signature is required at the end of semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Владимиров В. Туризм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.

DESCRIPTION OF THE COURSE

Name of the course: Circuit design and programming for microprocessors and microcontrollers	Code: BpES08	Semester: 6
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T)	Hours per semester: L – 30 hours T – 15 hours LW – 30 hours	Number of credits: 6
Course project (CP)	Code: BpE14	Number of credits: 2

LECTURER(S):

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COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: After subject completion the students know a characteristics, functionality, organization, development and applications of microprocessors and microcontrollers for electronic single-devices and systems manufacture and support.

DESCRIPTION OF THE COURSE: The main topics concern: Software model, instruction set, addressing modes of microprocessor; System bus organization of microprocessor single-devices and systems; Memory devices: RAM, EPROM, FLASH - characteristics and applications; Methods and circuits for address decoding; In-circuit, system and bus-oriented interfaces: theory, organization, circuits and applications; Counters and timers: organization, modes of operation, applications; Data acquisition systems: bus-oriented ADC and DAC; Microcontrollers - architecture, functionality and applications; Development, emulation, simulation and testing of microprocessor and microcontroller based devices and systems - methods and equipment. Assembler and C languages practice for microprocessors and microcontrollers.

PREREQUISITES: Physics, Digital electronic and Software skills

TEACHING METHODS: Lectures, using slides, case studies, laboratory, work in teams, protocols and defense, course project with defense.

METHOD OF ASSESSMENT: Written examination (70%), laboratory assessments (20%), test (10%). Additional assessment of course project after defense.

INSTRUCTION LANGUAGE: Bulgarian/English

BIBLIOGRAPHY: 1. Иванов Р., Михов Г., Електронни цифрови устройства и системи II част, С., Техника 1990. 2. Уилямс Г.Б., Отлатка микропроцесорных систем, М., Энергоатомиздат, 1988. 3. Рафикузаман М., Микропроцессоры и машинное проектирование микропроцесорных систем, М., МИР, 1988. 4. Щелкунов, И. И., Дианов А. П., Микропроцесорные средства и системы, М., Радио и связь, 1989. 5. Hitz K., Tabak D., Microcontrollers - Architecture, Implementation and programming, McGraw Hill, 1992.

DESCRIPTION OF THE COURSE

Name of the course: Electronic converters	Code: BpES09	Semester: 6
Type of teaching: Lectures(L) Laboratory work (LW)/Tutorials (T)	Hours per semester: L – 30hours T– 15 hours LW – 20 hours	Number of credits: 5

LECTURER(S):

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COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aims and objectives of the course are to teach students the types of power electronic converters, their basic power circuits and control systems. The students learn the modern circuits and theory, methods for analyses and design of power electronics circuits.

DESCRIPTION OF THE COURSE: The main topics concern: Power converters: definitions, classification and converter topologies; methods of analysis; characteristics, parameters and features of power semiconductor devices; Commutations techniques; Single-phase controlled rectifiers; Three-phase controlled rectifiers; AC/AC converters; Autonomous inverters - current source inverters, voltage source inverters, resonant inverters - analysis of the main circuits; Circuit topologies of autonomous inverters; Regulation and stabilization of voltage, current and power in autonomous inverters; Functional block-diagrams and principles of control systems; Drivers for control of MOS transistors and IGBT - International Rectifier (IR21xx), Microchip, IXYS (IXDDxx), Semikron, etc.; PWM and Resonant IC controllers.

The *seminars* give students knowledge in analysis and methods for designing the listed types of converters. In addition, *laboratory exercises* expand students' knowledge and provide opportunities for independent work.

PREREQUISITES: Electronic and semiconductor devices, Theory of electrical engineering, Electronic circuits theory, Power supplies and energy sources, Analogue circuits, Digital electronics.

TEACHING METHODS: Lectures, using slides, case studies, laboratory work, teams work, protocols preparation and defense, demo-programs.

METHOD OF ASSESSMENT: The exam consists of written answers to 3 of 5 questions, cases or tasks that productively test the student's knowledge and skills (80 %), laboratories (20 %).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: Main literature: 1. Горанов, П. Градивни елементи в силовата електроника, ТУ-София, 2017, ISBN: 978-619-167-3005-6; 2. Бобчева, М., С. Табаков, П. Горанов. Преобразователна техника, Техника, София, 2002 ISBN: 954-438-206-2; 3. Бобчева, М., П. Горанов, Г. Кънов, Цв. Григорова, Ръководство за лабораторни упражнения по основи на преобразователната техника. 2012, ISBN 978-954-9549-64-5; Additional literature: 1. Анчев, М. Силови електронни устройства, Изд. ТУ-София, 2019, ISBN: 978-619-167-373-5; 2. Бобчева, М. Н. Градинаров, Г. Малеев, Е. Попов, М. Анчев. Силова електроника, С., Изд. ТУ-София, 2001, ISBN: 954-438-212-7; 3. Mohan, N. Power electronics, A First Course. John Wiley & Sons, 2012; ISBN 978-1-118-07480-0, 4. OrCad Pspice A/D Reference Manual, 2015

DESCRIPTION OF THE COURSE

Name of the course: Control Systems	Code: BpES10	Semester: 6
Type of teaching: Lectures (L) Tutorials (T) Laboratory work (LW) Course work (CW)	Hours per semester: L – 30 hours T – 15 hours LW – 20 hours	Number of credits: 6

LECTURER(S):

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COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Design and programming of electronic systems", Professional orientation 5.2 Electro technique, electronics and automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Students should be able to apply the laws of regulation in the design of electronic regulators that are used in industry, communications, energy, transport and other areas, as well as to choose the appropriate regulation law according to the assigned transition processes of the closed regulation system..

DESCRIPTION OF THE COURSE: Main themes: Identification of the objects of regulation; Position regulators; Proportional and proportionally-integrated law for regulation; Proportional- differential regulation law; Proportional Integral-Differential law for regulation; Methods for regulating the speed of a DC motor; Frequency speed regulation of an asynchronous motor; Digital thermometer and thermostat; Digital control systems; Tracking and memorizing systems; Numerical design with approximation; Choice of regulation law; Adjusting the controller parameters according to the requirements for the transition process.

PREREQUISITES: Analog Circuit Engineering, Digital Circuits, Transformation Engineering,

TEACHING METHODS: The lectures are presented with the help of a multimedia projector and by writing the board, considering the structure of the lecture, definitions and basic theoretical concepts, quantities, drawings, dependencies, graphs and formulas. Students are provided with the content of the lectures delivered in electronic format.

METHOD OF ASSESSMENT: Written exam at the end of the semester (70%), laboratories (20%), course work - one off assignment (10%).

INSTRUCTION LANGUAGE: Bulgarian/English

BIBLIOGRAPHY: 1. Ivanov S., Electronic regulators, Technical University of Sofia, 2008; 2. Kaloyanov G., Automation of production and control, S.,T.,1992; 3. Ivanov I., Relay electronic regulators,S.,T.,1978; 4. Naplatanov K., Hinov H., Automation of technological processes, S.,T.,1987; 5. Klashe G. Hofer R., Industrial electronic circuits, S.,T.,1984; 6. Ivanov S., Vasileva S., Laboratory exercises manual on Electronic Regulators, Plovdiv, 2001.

DESCRIPTION OF THE COURSE

Name of the course: Automation of engineering work in electronic devices and systems	Code: BpES11	Semester: 6
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T) Course work (CW)	Hours per semester: L – 30 hours T – 15 hours LW – 20 hours	Number of credits: 5

LECTURER(S):

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Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical engineering, electronics and automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The objective of the course is to acquaint the students with the contemporary computer aided design systems in electronics, as well as with the trends in their development. The course will give the students knowledge how to apply the existing EDA tools and to develop new computer-aided design approaches.

DESCRIPTION OF THE COURSE: The main topics concern: The main approaches and algorithms used in modern systems for automated design in electronics are considered; formation and solving of the equations of the electronic circuits; analysis of nonlinear electronic circuits; time domain analysis; sensitivity and tolerance analysis of electronic circuits; modeling and design of hybrid integrated circuits; application of optimization in the automated design of electronic circuits; automation of structural design; The possibilities of CAD systems for PCB design are also presented.

PREREQUISITES: Mathematics, Electrical engineering, Electronic circuits theory, Analog circuits and Digital circuits.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and course work, work in teams, protocols and course work description preparation and defence.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (70%), laboratories (18%), course work (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. 1. Боянов, Й., Л. Райковска, В. Фурнаджев, Автоматизация на проектирането и конструирането в електрониката, Техника, София, 1991; 2. Райковска, Л., Е. Гаджева, Автоматизация на проектирането в електрониката и комуникациите – част I, Моделиране и симулация с OrCAD PSpice, Меридиан 22, София, 2005. 3. Димитрова, В., Практическо проектиране с OrCAD, Амикорт, София, 2005.

DESCRIPTION OF THE COURSE

Name of the course: Management and marketing	Code: BpES12	Semester: 6
Type of teaching: Lectures (L) Tutorials (T)	Hours per semester: L – 30 hours T – 15 hours	Number of credits: 4

LECTURER(S):

Assist. Prof. Elena Zlatanova-Pazheva, PhD (FME), tel.: 032 659 712,
e-mail: elyzlatanova@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2. Electrical engineering, electronics and automation

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course, the students are expected to have basic knowledge of the main managerial functions and processes in the contemporary organization, to be able to apply the marketing tools for market impact, to have basic knowledge on the marketing principles and strategies, and use them to gain a market competitive advantage.

DESCRIPTION OF THE COURSE: The course covers the basic marketing concepts and management principles, the elements of the marketing environment, market segmentation and positioning. The marketing concepts and the most frequently used marketing strategies in practice are considered. The applicable methods for planning and organizing marketing research, as well as the model of consumer behavior are studied. The marketing tools, expressed through product, pricing, promotion and communication policy, are considered in details. The scope of product policy includes the study of the product and the main product attributes, as well as the concept and strategies for the product life cycle. Attention is paid to innovation and service marketing. The section on pricing policy studies the main methods for pricing and basic pricing strategies. The promotion policy is presented in relation to the distribution channels and the marketing strategies for the realization of the product. The communication policy considers the communication mix of advertising and non-advertising means for influencing the market. Detailed attention is paid to Digital Marketing and the main technologies used in Internet marketing.

PREREQUISITES: Management, Economics.

TEACHING METHODS: Lectures using presentations, discussions with the active participation of students after preliminary preparation. Seminar exercises - presentation of topics developed by students, according to the educational program and discussion of cases.

METHOD OF ASSESSMENT: final assessment, which is formed by two components: Test with a coefficient of gravity 0.70 and an assessment of the work from the exercises with a coefficient of 0.30

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Dimova, N., Marketing aspects of emotional shopping, NBU, 2013, 2. Branson, R., Business of the Future, AMG Publishing 2017, 3. Kaftandjiev, H., Harmony in Advertising Communication, University Publishing House "St. Kliment Ohridski ", Sofia, 2013, 4. Kaftandjiev, H., Mythological Archetypes in Communications, University Publishing House "St. Kliment Ohridski ", Sofia, 2015, 5. Krusteva, N., Contemporary marketing, Volume 1, Avangard Prima, Sofia, 2013, 6. Krusteva, N., Contemporary marketing, Volume 2, Avangard Prima, Sofia, 2013; 7. Holt, D., How brands become icons, Bookmark, Sofia, 2010; 8. Klasova, S., Prices in the marketing system, University Publishing House "Economy", 2011; 9. Krusteva, N., Customer Relationship Management. Sales, Avangard Prima, 2010; 10. Kiberman, T., Rank № 1 in Google 2017, Franchising BG Ltd., 2016; 11. Fileva, P., Media Marketing, Sofia

University “S. Kliment Ohridski ”, 2013; 12. Georgieva, E., Kehayova-Stoycheva, M., Stanimirov, E., Marketing, ed. Steno, 2012; 13. Levinson, J. Conrad, Guerrilla Marketing, ed. East-West, 2011; 14. Marinova, N., International Marketing, NBU, 2017; 15. Shterev, N., Marketing-part 1, ed. Martilen, 2016; 16. Shterev, N., Marketing-part 2, ed. Martilen, 2010; 17. Shaffer, N. The Age of Influencer Marketing, AlexSoft, 2020; 18. Kotler, Ph., Marketing 4.0: From the Traditional to the Digital, Locus, 2019; 19. Godin, S., This is Marketing, ed. Locus, 2020; 20. Mann, I., Marketing without a Budget, AMG Publishing, 2018; 21. Indjova, Ts., Marketing Management, NBU, 2012; 22. Ryan, D., Digital marketing, 3rd edition, Kogan page limited, 2014; 23. Stokes, R., eMarketing, 5th edition, Quirk Education Ltd, 2013; 24. Russev, P., Power of the people, The new marketing, eAcademy, 2011; 25. Kotler, Ph., Armstrong, G., Principles of Marketing, Pearson Prentice Hall, 2012;

DESCRIPTION OF THE COURSE

Name of the course: Practicum	Code: BpES13	Semester: 6
Type of teaching: Lectures (L) Laboratory work (LW)/Tutorials (T) Course work (CW Non-Auditorium Study (NA))	Hours per semester: L – 0 hours T – 0 hours LW – 0 hours NA – 60 hours	Number of credits: 2
Course project (CP)		

LECTURER:

Assoc. Prof. Eng. Rossen Bozhilov, PhD (FEA), e-mail: rossen_chi@tu-plovdiv.bg
Technical University of Sofia,

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical engineering, electronics and automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The course aims trained students to gain practical habits, skills and knowledge of direct participation in the assembly and testing of components and circuits of electronic devices. During the course provides implementation of specific electronic circuits with implementation and adjustment.

DESCRIPTION OF THE COURSE: Experimental laboratory work, in an non-auditorium environment, lasting one semester. Depending on the topic, the students develop a project-oriented tasks, which include several stages of the engineering practice – from the technical specification, project solution, analysis, physical design – to the realization and experimental testing. EDA tools are provided for the realization of the design stages, as well as measurements of the project characteristics. The training structure and organization are close to the engineering practice in order to serve as a transition to professional realization of the students

PREREQUISITES: Electrotechnical materials, Programming, Theoretical Electrical Engineering, Electrical Measurements, Programming, Semiconductor Elements, Theory of Electronic Circuits, Analog Circuitry, Digital Circuitry, Electromechanical Systems, Power Supplies and energy sources, Impulse circuitry and devices.

TEACHING METHODS: Non-Auditorium classes with a practical focus.

METHOD OF ASSESSMENT: The form of control is through the assessment "Confirmed course"

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Towers, Thomas, Transistor Selector, Technica press, Sofia 1998.; 2. Zlatarov V. Donevski at al. "Analog electronic circuits and systems", Technica Publishing House, Sofia 1995.; 3. Konov K., Pulse and digital circuits with integral TTL elements, I and II part, Technica press, Sofia 1998.; 4. Clayton G., Operational Amplifiers, Technica press, Sofia 2002.

DESCRIPTION OF THE COURSE

Name of the course: Sport	Code: SPR06	Semester: 6
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T) Self-Study (SS)	Hours per semester: L – 0 hours T – 0 hours SS – 30 hours	Number of credits: 1

LECTURER(S):

Sen. Lect. Daniel Vladimirov, PhD (FEA), tel.: 032 659 646, e-mail: danielv@tu-plovdiv.bg

Sen.Lect. Petar Doganov, PhD (FEA), tel.: 032 659 648, e-mail: pdoganov@tu-plovdiv.bg

Sen.Lect. Boris Spasov, PhD (FEA), tel.: 032 659 647, e-mail: boris_spasov@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curriculum for training of students to obtain Bachelor's degree, specialty “Automation, Information and Control Systems”, “Electrical Engineering”, “Design and programming of electronic systems” Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Targeted at further developing of students’ physical activities, skills and hygiene habits through effective methods of physical education, improving their mental and physical performance.

DESCRIPTION OF THE COURSE: The knowledge and skills in Physical Education and Sports develop a wide range of motor skills and habits, help the hardening of the body and contribute to the moral development of students. The enhancement of physical skills is carried out through:

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.
2. Sports-Specific Physical Preparedness (SPP) – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curricula presume the minimum of knowledge and skills acquired at secondary school.

TEACHING METHODS: Seminars in accordance with the curriculum in PE and Sport.

METHOD OF ASSESSMENT: Evaluation is based on functional tests at the end of semester. Lecturer’s signature is required at the end of semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Владимиров В. Туризм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.

DESCRIPTION OF THE COURSE

Name of the course: Project Management	Code: FaBpAICE03.1, FaBpEE01, FaBpES01	Semester: 6
Type of teaching: Lectures(L) Laboratory work (LW)	Hours per semester: L – 15hours LW – 30 hours	Number of credits: 3

LECTURER(S):

Chief Assistant Professor Georgi Georgiev, PhD tel. 0888 22 72 82, email: georgi@tu-plovdiv.bg,
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curricula for training of students to obtain Bachelor's degree, specialties Automation, Information and Control Engineering, Design and programming of electronic systems and Electrical Engineering, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Upon completion students will have basic knowledge of the Project Management processes and will acquire skills for identifying project ideas and turning them into project proposals of different forms.

DESCRIPTION OF THE COURSE: The course is focused on identifying project ideas and turning them into project proposals. Main topics are: Definitions of Project management, Projects and types of projects; The project as an instrument for meeting organizational needs and attracting funding; Methods and techniques for project development; Main elements of the project cycle and the project proposal; Developing project activities and identifying necessary resources; Project budgeting; Project implementation and management; Project teambuilding.

PREREQUISITES: none.

TEACHING METHODS: Lectures with slides and topic discussions; lab work including group case study discussions and an individual assignment with a Powerpoint presentation defense.

METHOD OF ASSESSMENT: Final written exam (60%) and individual assignment defense(40%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:1. Adrienne Watt, Project Management, Victoria, B.C.: BCcampus., 2014. ISBN 978-1-77420-012-4; 2. A Guide to the Project Management Body of Knowledge (PMBOK Guide), Sixth Edition 2017, ISBN: 978-1-62825-390-0; 3. Stephen Barker and Rob Cole, Brilliant Project Management: What the best project managers know, do, and say; Pearson 2014 , ISBN 9780273775096; 4. Joseph Heagney, Fundamentals of Project Management, Fourth Edition; 2012 American Management Association, ISBN-13: 978-0-8144-1748-5; 5. Lee A. Swanson, Business Plan Development Guide, Saskatoon, Saskatchewan 2017, ISBN 978-0-88880-618-5; 6. Владимир Иванов,. „Ръководство за подготвяне на бизнес план“ на Център по предприемачество към Технически университет – София, филиал Пловдив, 2010.