DESCRIPTION OF THE COURSE

Name of the course: **Power supplies**	Code: **BpE01**	Semester: **5**
Type of teaching: Lectures(L) Laboratory work (LW)/Tutorials (T)	Hours per semester: L – 30hours T– 15 hours LW – 20 hours	Number of credits: **6**
Course project (CP)	Code: BpE07	Number of credits: **2**

LECTURER(S):
Assist. Prof. Eng. Geogi B. Bonev, PhD (FEA-Plovdiv), tel.: +359895 587264,
e-mail: bonev@tu-plovdiv.bg
Technical University of Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory curricula for training of students to obtain Bachelor's degree, specialty ELECTRONICS, Professional orientation 5.2.Electrical, Electronics and Automation, field 5.Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The purpose of the lectures and the laboratory exercises is to give to the students an idea of the principle of operation and the modes of operation of the power supply devices, and to obtain practical experience with such devices.

DESCRIPTION OF THE COURSE: Parameters and characteristics of the main schemes of power supply units and converters of electric energy are considered. Linear stabilizers of voltage, current and power, basic schemes of pulse converters of electric energy, power semiconductor elements necessary for the construction of power supply units are considered. Students get acquainted with the methods of analysis and design through the use of simulation software tools and models - Micro-Cap, PSpice, MATLAB, KiCAD and others. Additionally, a course project for design of such a power supply device for a specific assignment is included.

PREREQUISITES: Required knowledge in disciplines: Electrical engineering, Semiconductor devices, Analog electronics, Automatic control.

TEACHING METHODS: Lectures, using slides, case studies, laboratory exercises with protocols and simulation software tools: Micro-Cap, PSpice, MATLAB, KiCAD. Independent work of students on the course project, conducting consultations.

METHOD OF ASSESSMENT: Two written current grades in the middle and at the end of the semester (35% in total), laboratory work (15%), with the solution of the one problem (50%). Interview and defense of the course project - evaluation of the design of the course project -20%, general assessment of the project -80%: theoretical part-20%, calculated part-40%, modeling, practical research and pursuit - 40%.

INSTRUCTION LANGUAGE: Bulgarian/English

BIBLIOGRAPHY: 1. Stefanov N.Y., Atanasov T.B., Manoilov A.G. - "Handbook of power supplies", Sofia, ed. Technique, 1990; 2. Marty Brown "Power Supplies", translated from English - S. Kutsarov, Sofia, Technique 1997; 3. Marty Broun – “Practical Switching Power Supply Design”, Academic Press 1990, ISBN 0-12-137030-5; 4. Keith Billings, Taylor Morey – “Switching Power Supply Handbook”, Third Edition, Mc Graw Hill 2011, ISBN: 978-0-07-163972-9; 5. N. Stefanov - "Guide for the design of power supplies", Sofia, ed. Technique 1988, Sofia; 6. https://www.onsemi.com/products/discretes-drivers/general-purpose-and-low-vcesat-transistors; 6. www.ti.com.

DESCRIPTION OF THE COURSE

Name of the course: **Circuitry for impulse and mixed signals**	Code: **BpE02**	Semester: **5**
Type of teaching: Lectures (L) Tutorials (T) Laboratory work (LW)	Hours per semester: L – 30 hours T – 10 hours LW – 20 hours	Number of credits: **5**

LECTURER(S):
Assoc. Prof. Eng. Svetoslav Ivanov, PhD (FEA), tel.: 032/659 720, e-mail: blueflam@tu-plovdiv.bg
Assist. Prof. Eng. Ilya Petrov, PhD (FEA), tel.: 032/659 766, e-mail: iedu@abv.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 "Electronics", Professional orientation 5.2 Electro technique, electronics and automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim is to provide students with knowledge of the methods and means for receiving, converting, amplifying and measuring electrical impulse and mixed signals. They will gain knowledge on the analysis and synthesis of impulse circuits and converters as well as their application areas.

DESCRIPTION OF THE COURSE: The discipline is fundamental to the knowledge and skills in the design of impulse circuits and devices for digital-analog and analog-to-digital signal conversion. The course material covers the issues related to the analysis of transient processes in impulse circuits, their variants and methods for their design. Students will also be acquainted with the fields of application of impulse circuits and signal converters.

PREREQUISITES: Knowledge of Electronic and Semiconductor Elements; "Electronic Analog Circuits and Devices", "Electronics Measurements" and "Signals and Systems".

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: Two one-hour assessments at mid and end of semester (80%), laboratories (20%).

INSTRUCTION LANGUAGE: Bulgarian/English

BIBLIOGRAPHY: 1. М. Димитрова, Импулсни схеми и устройства в 2 тома, С., Техника, 1987г.; 2. К. Конов, Импулсни схеми, (Наръчник по електронни схеми, ч. VII), С. Техника, 1984г.; 3. Й. Янсен, Курс цифровой электроники, ч. I, изд. Мир, Москва, 1987г.; 4. Rick Lyons, Streamlining Digital Signal Processing, Wiley 2012; 5. Martin Vetterli, Jelena Kovacevíc, Vivek K Goyal, Foundations of Signal Processing, Massachuset tsInstitute of Technology & Boston University, Cambridge University Press 2014

DESCRIPTION OF THE COURSE

Name of the course: **Programming III**	Code: **BpE03**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T) Course work (CW)	Hours per semester: L – 30 hours T – 30 hours LW – 0 hours	Number of credits: **5**

LECTURER(S):
Assoc. prof. eng. Mitko Shopov, PhD (FEA), tel.: 659 765, e-mail: mshopov@tu-plovdiv.bg
Assist. prof. eng. Vasil Popov, PhD (FEA), tel.: 659 525, e-mail: vasil_popov@tu-plovdiv.bg
Technical University of Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, speciality "Electronics", Faculty of Electronics and Automation, Professional Field 5.2 Electrical Engineering, Electronics and Automation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to acquire fundamental knowledge for good practices in the software industry, methodology for designing, developing and integrating software products, quality code principles and software project management, and to give students basic knowledge for developing different types of software applications using programming language Python.

DESCRIPTION OF THE COURSE: Main topics: Design and integration of software systems; Typical architectures, architectural patterns; Python programming language syntax; Basic language constructions; Data structures; Basic types of operators, data and calculations; Functions and files; Modules and packages; Object oriented programming; Classes, methods, attributes, constructors, inheritance; Graphical user interface; More complex structures and language constructions; Software implementation using date and time, HTTP and formats CSV, XML, JSON; Parallel programming; Synchronous and asynchronous programming; Introduction to data science and machine learning; Data analysis and scientific calculations; Creation of static, animated and interactive visualizations; Project management tools; Test-driven design, Integration and testing of a more complex application.

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

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

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

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Mark Lutz, Learning Python, 5th Edition, O'Reilly, 2013. 2. Gary Smart, Practical Python Programming for IoT, Packt Publishing, 2020. 3. Paul Jones, Python: The Fundamentals of Python Programming, 2016. 4. 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: **BpE04**	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 Electronics, 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 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 (80%), laboratories (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: **Electronic measurement systems**	Code: **BpE05**	Semester: 5
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T)	Hours per semester: L – 30 hours T – 0 hours LW – 30 hours	Number of credits: 5

LECTURER(S):
Assoc. Prof. Eng. Ivan Rachev, PhD (FEA), tel.: 032/659 718, e-mail: ivr@tu-plovdiv.bg
Assist. Prof. Eng. Rosen Bojilov, PhD (FEET), tel.: 032/659 764 , e-mail: rossen_chi@abv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: The course is compulsory for the students specialty "Electronics" for educational and qualifications degree "bachelor"..

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to give the students knowledge of electronic measurement systems and instrumentation. It allows the students to develop instrumentation, data acquisition and analysis software using modern equipment and software tools..

DESCRIPTION OF THE COURSE: The base problems, witch are discussed in the course are the operating principles of measurement hardware, errors, standards, current and voltage measurement, compensating techniques, oscilloscopes and computer based measurement systems and virtual instruments..

PREREQUISITES: Electrical Engineering Theory, Semiconductor devices, Signals and systems Analogue electronics, Electrical measurements.

TEACHING METHODS: lectures, tutorials, laboratory work, protocols..

METHOD OF ASSESSMENT: : Two-hour assessment at the end of the semester (80 %) and laboratory work (20 %).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: :
1. Stoyanov, I.: Electronic Measurement Systems. Technical University of Sofia, Sofia, 2000. 2. Stefanova, K. et all, Electronic Measurement Systems – Laboratory works, Plovdiv, 1995. 3. Comer, D., *Fundamentals of Electronic Circuit Design*, NY, John Wiley & Sons, 2003.

DESCRIPTION OF THE COURSE

Name of the course: **Practicum**	Code: **BpE06**	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:

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

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialties "Electronics", 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, Circuitry for Pulse and Mixed Signals, Quality and Reliability in Electronics, Measurements in Electronics.

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: **Power Supplies - Semester Project**	Code: **BpE07**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)/ Tutorials (T) Course work (CW)	Hours per semester: L – 0 hours T – 0 hours LW – 0 hours	Number of credits: **2**

LECTURER(S):

Assist. Prof. Eng. Geogi B. Bonev, PhD (FEA-Plovdiv), tel.: 359895 587264,
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Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory curricula for training of students to obtain Bachelor's degree, specialty ELECTRONICS, Professional orientation 5.2.Electrical, Electronics and Automation, field 5.Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Acquisition of knowledge and skills by students in the design of power supplies. Introduction to the element base in the development of power supply devices and methods for design and research. Getting acquainted with the requirements for drawing up the technical documentation.

DESCRIPTION OF THE COURSE: Includes: design of linear stabilizers of voltage, current and power, design of basic circuits with pulse stabilizers - step-down, step-up, buck-boost converters. Simulation modeling and research of power supply devices with simulation tools and languages - Micro-Cap, PSpice, MATLAB, KiCAD**.**

PREREQUISITES: Required knowledge in disciplines: Electrical engineering, Semiconductor devices, Analog electronics, Automatic control theory, Power supplies.

TEACHING METHODS: Independent work of students, conducting consultations.

METHOD OF ASSESSMENT: Interview and defense of the course project - evaluation of the design of the course project -20%, general assessment of the project -80%: theoretical part-20%, calculated part-40%, modeling, practical research and pursuit - 40%.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. N. Stefanov - "Guide for the design of power supplies", Sofia, ed. Technique 1988, Sofia; 2. Stefanov N.Y., Atanasov T.B., Manoilov A.G. - "Handbook of power supplies", Sofia, ed. Technique, 1990; 3. Marty Brown "Power Supplies", translated from English - S. Kutsarov, Sofia, Technique 1997; 4. Marty Broun – “Practical Switching Power Supply Design”, Academic Press 1990, ISBN 0-12-137030-5; 5. Keith Billings, Taylor Morey – “Switching Power Supply Handbook”, Third Edition, Mc Graw Hill 2011, ISBN: 978-0-07-163972-9

DESCRIPTION OF THE COURSE

Name of the course: **Microprocessor techniques**	Code: **BpE08**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours S – 15 hours LW – 30 hours	Number of credits: **6**
Course project (CP)	Code: **BpE14**	Number of credits: **2**

LECTURER(S):
Assoc. Prof. Eng. Boyko Petrov, PhD (FEA), tel.: 659760,e-mail: bpetrov@tu-plovdiv.bg
Technical University of Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum / curricula for training of students in Bachelor's degree, speciality Electrical, Electronics and Automation, Professional orientation 5.2, 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 equipments.

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 микропроцессорных систем, М., Энергоатомизіат, 1988. 3.Рафикузаман М., Микропроцессоры и машинное проектирование микропроссорных систем, М., МИР, 1988. 4.Щелкунов, И. И., Дианов А. П., Микропроцессорные средства и системы, М., Радио и связь, 1989. 5.Hitz K., Tabak D., Microcontrollers - Architectute, Implementation and programming, McGraw Hill, 1992.

DESCRIPTION OF THE COURSE

Name of the course: **Microelectronics**	Code: **BpE09**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 20 hours	Number of credits: **5**

LECTURER(S):
Assoc. Prof. Eng. Anton Lechkov, PhD (FEA), tel.: 032659766, e-mail: lechkov@tu-plovdiv.bg
Assoc. Prof. Eng. Svetoslav Ivanov, PhD (FEA), tel.:032659720, e-mail: blueflam@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 Electronics, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Introduction to the basic technological processes in microelectronics; basic microelectronic elements;basic knowledge of microelectronic circuits and Microelectromechanical Systems (MEMS). Graphical user interface Active-HDL for design development, starting from a hardware description.

DESCRIPTION OF THE COURSE: Basic subjects: **Introduction:** Main characteristics. Basic concepts. Stages of development. Materials in microelectronic production. **Technological processes in microelectronics:**Classification of technological processes.Forming semiconductor junctions and layers.Thin insulating and conducting layers. Cleansing and removing thin layers. Transfering the topographic image . Assembly of elements. **Microelectronicelements:** Classificationandstructure. Hybrid Integrated Circuits. BipolarandMOSelements. **Microelectroniccircuits**: Basic elements. Analog Integrated Circuits. Digital integrated circuits. Memory - types, organization. Specialized modules. Microelectromechanical Systems (MEMS): General Information. MEMS sensors and actuators.Active-HDL is a new generation VHDL simulator. Its context graphical user interface starting from a hardware description, through synthesis, implementation, and debugging to design simulation.

PREREQUISITES: Courses of Physics, Semiconductor devices, analog circuits, electronics measurements.

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. Laboratory work..

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (70%), laboratories (30%).

INSTRUCTION LANGUAGE: Bulgarian,English

BIBLIOGRAPHY:
1.Атанасов,А.С.,Основи на микроелектрониката, С., Техника 1987; 2. Вълков, С. А., Микроелектронна схемотехника, София, Техника 1987; 3. Razavi, B., Fundamentals of Microelectronics, 2007, ISBN / ASIN: 047007292X; 4. М. Христов, Системи за проектиране в микроелектрониката, София, 2004г.; 5. Campbeli, St., The Science and Engineering of Microelectronic Fabrication, Oxford University Press, 2001; 6. MEMS Introduction and Fundamentals, © 2006 by Taylor & Francis Group, LLC.

DESCRIPTION OF THE COURSE

Name of the course: **Electronic regulators**	Code: **BpE10**	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):
Assoc. Prof. Eng. Svetoslav Ivanov, PhD (FEA), tel.: 032/659 720, e-mail: blueflam@tu-plovdiv.bg
Assist. Prof. Eng. Rossen Bojilov, PhD (FEA), tel.: 032/659 766, e-mail: rossen_chi@abv.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 "Electronics", 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, Sensor Technology, Theory of Automatic Control and Microprocessor 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: **Computer aided design in Electronics**	Code: **BpE11**	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):
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 Electronics, 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 (62%), laboratories (18%), course work - two off assignments (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: **BpE12**	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 Electronics, 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: **BpE13**	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, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialties "Electronics", 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 projectoriented 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, Circuitry for Pulse and Mixed Signals, Quality and Reliability in Electronics, Measurements in Electronics,Power electronics, Microprocessor circuitry.

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: **Microprocessor techniques – Course project**	Code: **BpE14**	Semester: **6**
Type of teaching: Course project (CP)	Hours per semester: 60	Number of credits: **2**

LECTURER(S):
Assoc. Prof. Eng. Boyko Petrov, PhD (FEA), tel.: 659760,e-mail: bpetrov@tu-plovdiv.bg
Technical University of Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum / curricula for training of students in Bachelor's degree, speciality Electrical, Electronics and Automation, Professional orientation 5.2, Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Upon completion of the course, students have knowledge and skills in the field of hardware and firmware design of electronic devices and systems based on microprocessors and microcontrollers.

DESCRIPTION OF THE COURSE: Main topics: System check-list of a microprocessor, Features of working with general-purpose input/output ports, System memory organization, memory map and address decoding circuits, Design, initialization and use of intra- and inter- system interfaces; Types, modes of operation and application of peripheral timers – initialization procedures and methods of using; Input and output of analog signals in microprocessor systems; Design and firmware of keyboards and displays

PREREQUISITES: Physics, Digital electronic and Software skills

TEACHING METHODS: Work on individual design assignments, individual, group and thematic consultations.

METHOD OF ASSESSMENT: Defense of an individual course project

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 микропроцессорных систем, М., Энергоатомизіат, 1988. 3.Рафикузаман М., Микропројессоры и машинное проектирование микропроссорных систем, М., МИР, 1988. 4.Щелкунов, И. И., Дианов А. П., Микропроцессорные средства и системы, М., Радио и связь, 1989. 5.Hitz K., Tabak D., Microcontrollers – Architectute, Implementation and programming, McGraw Hill, 1992.

DESCRIPTION OF THE COURSE

Name of the course: **Project Management**	Code: **FaBpAICE03.1, FaBpEE01, FaBpE01**	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, Electronics 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.