ХАРАКТЕРИСТИКА НА УЧЕБНАТА ДИСЦИПЛИНА

Name of the course: **Electromechanical devices**	Code: **BE48**	Semester: **7**
Type of teaching: Lecturers (L) Laboratory work (LW)	Lessons per week: L- 2 hours; LW- 1 hours	Number of credits: **5**

LECTURER: Assoc.Prof. Ph.D. Georgi Ganev,
department of Electrical Engineering, tel.:032 659560, email: gganev@tu-plovdiv.bg,
Technical University of Sofia, Plovdiv branch

COURCE STATUS OF THE CURRICULUM: Compulsory course for students specialty "Electronics" BEng programme at the Faculty of Electronics and Automation of Technical University of Sofia, Plovdiv branch.

AIM AND OBJECT OF THE COURSE: On the completion of the course the students should be able to know the principles of electromechanical power conversion, the construction, principles of operation and characteristics of protection, signal and control electrical apparatuses; to know the construction, principles of operation and characteristics of the one-phase transformers, induction, synchronous and DC machines, their applications, mains start-up and speed control methods.

DISCRIPTION OF THE COURSE: The main topics concern: Electrical contact; Current commutation in electrical circuits; Electromagnetic devices; Electrical apparatuses for control and protection; Single phase transformers - construction and operation principle, main relationships, steady-states behaviors; Induction, synchronous and DC machines – constructions, principles of operation, steady-state behaviors.

PREREQUISITES: Mathematics, Physics, Mechanics, Material Science, Electrical Materials, Electrical Engineering Theory, Electrical measurements.

TEACHING METHOD: Lectures with application of demonstrative aids. Laboratory works in teams (3-4 students each). Students should write laboratory report for each laboratory exercise.

METHOD OF ASSESMENT: Continuous assessment is used. The final score is aggregate of the mid-term and end-term one-hour tests providing 80% of the final score and assessment of the laboratory exercises providing 20% of the final score.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Божилов Г., Е.Соколов, Електромеханични устройства, София, 2010.
2. Минчева М. Електромеханични устройства, София, 2010.
3. Динов В., Ст.Шишкова. Електрически машини, ч.I и ч.II, Пловдив,2008.
4. Александров, А., Електрически апарати, София, 1999.
5. Тодоров. Г., Б.Стоев. Синхронни двигатели с постоянни магнити. София, 2019.
6. Toliyat, H., G.Kliman. Handbook of electric motors, N.Y.2004.

DESCRIPTION OF THE COURSE

Name of the course: **Computer aided design in Electronics**	Code: **BE49**	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: **5**

LECTURER:

Assoc. Prof. Boryana Pachedjieva, PhD., (FEA) - tel.: 659708

e-mail: pachedjieva@yahoo.com

Technical University of Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM:

Compulsory for the students specialty "Electronics" " BEng programme of FEA.

AIMS AND OBJECTIVES OF THE COURSE:

The objective of the course is to acquaint the students with the contemporary computeraided 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 approaches and algorithms used in the contemporary computer-aided design systems in electronics, are considered. The principles of their construction, the possibilities of the input languages and the control of computational process are presented. The possibilities of CAD systems for modeling and simulation of electronic equipment are discussed: standard analyses, investigation of the influence of design tolerances on the circuit characteristics, stability analysis. The possibilities of CAD systems for printed circuit board design are also presented.

PREREQUISITES:

Mathematics I, II, Electrical engineering, Electronic circuits theory, Signals and systems, Analog circuits and Digital circuits.

TEACHING METHODS:

Lectures. The laboratory work give the students practical skills in using the general-purpose CAD systems under the assistant guidance. The newest available student versions of the studied program products are used for the laboratory work. Manuals and user's guides in electronic form are accessible for the students.

INSTRUCTION LANGUAGE:

Bulgarian.

METHOD OF ASSESSMENT: Written exam.

BIBLIOGRAPHY:

1. Raykovska, L., E. Gadjeva, Computer-aided design in electronics and communications, Book 1**Modeling and simulation using OrCAD PSpice, Sofia, Meridian 22, 2005; 2.** Боянов, Й., Л. Райковска, В. Фурнаджев, Автоматизация на проектирането и конструирането в електрониката, Техника, София, 1991; 3.Димитрова, В., Практическо проектиране с OrCAD, Амикорт, София, 2005. 4. Райковска, Л., С. Милчева, Ръководство за лабораторни упражнения и курсов проект по автоматизация на проектирането, ТУ-София, 1993; 5. Василева, Т., Н. Тюлиев, Проектиране на печатни платки с персонални компютри, Техника, София, 1992; 6. 6. Steffora, A, C. Fasca. OrCAD - OrCAD Layout Plus, OrCAD Layout, and OrCADLayout Engineer's Edition 9.0 - Product Announcement - Brief Article.Electronic News, Sept 7, 1998; 7. OrCad Capture User's Guide, 2000; 8. OrCad Layout User's Guide, 2000.

Name of the course **Medical electronic equipment**	Code: **BE50.1**	Semester: **7**
Type of teaching: Lectures, laboratory work, Course project	Lessons per week: L – 2 hours; LW – 2 hours;	Number of credits: **5**

<u>**LECTURERS**</u>:
Prof. Ph.D. Galidiya Petrova (FEA), Dept. of Electronics – tel.: 659 574,
e-mail:, Technical University of Sofia, branch Plovdiv

<u>**COURSE STATUS IN THE CURRICULUM:**</u> Obligatory elective (modular) course for the students in B.Sc. program in Electronics.

<u>**AIMS AND OBJECTIVES OF THE COURSE:**</u> The aim of the course is to teach the students how to apply the approaches, methods and technical means for analysis and synthesis of electronic devices and devices with specific application in the medical electronic equipment, to acquire new knowledge and opportunities in this subject area.

<u>**DESCRIPTION OF THE COURSE:**</u> The course is designed to acquaint students with the theoretical foundations and the principles of action of modern medical devices for the registration of biopotentials. The characteristics and parameters of the biopotentials generated by the heart, the cerebral cortex and the muscles in the patient's body, the leads systems, the characteristics and the technical requirements of the apparatus for their reliable amplification and registration are studied. The circuit diagrams of the apparatuses, as well as the principal schemes and specific features of the individual blocks, are considered. Students are acquainted with various clinical applications of Bioimpedance Measurements, specificities and technical requirements to individual blocks of aparatus as well as specific schematic solutions. The impact of electric currents on human tissues and organs are studied. The methods and devices for direct current, low and medium frequency alternating currents and current pulses therapy are discussed.

<u>**PREREQUISITES:**</u> Good fundamental knowledge in the courses: Analogue and digital electronics, Microprocessor technic.

<u>**TEACHING METHODS**</u>: Lectures using multimedia presentations, laboratory exercises with protocols containing experimental results and oral defense of course project with description.

<u>**METHOD OF ASSESSMENT:**</u> Two hours written exam at the end of semester in the form of a test with open questions. The final grade for the course is based on the exam results (80% in total) and work on laboratory exercises (20%).

<u>**INSTRUCTION LANGUAGE:**</u> Bulgarian

<u>**BIBLIOGRAPHY:**</u>

1. Petrova G., Medical electronic equipment, 2019, TU-Sofia; 2. Petrova G., 1998, Introduction to Biological Signal Processing, Inter-University Centre for Education in Medical Radiation Physics and Engineering.; 3. Carr J. Brown J., 1981, Introduction to Biomedical Equipment Technology, *John Wiley&Sons*.; 4. Metting Van Rijn, Peper A., Grimbergen C.A, 1990, 'High-quality recording of bioelectrical events, Part 1 Interference reduction, theory and practice', *Med. Biol. Eng. Comput.*, 28, p.389-397.

DESCRIPTION OF THE COURSE

Name of the course **Electronic devices for measuring non-electrical quantities**	Code: **BE50.2**	Semester: 7
Type of teaching: Lectures and laboratory work,	Lessons per week: L –2 hours; LW – 2 hours	Number of credits: **5**

LECTURER:

Assoc. Prof. Ph.D.. Svetoslav Ivanov (FEA), tel.: 032 659720, email: bluflam@tu-plovdiv.bg

Technical University of Sofia, branch Plovdiv.

COURSE STATUS INTHE CURRICULUM: Compulsory elective course from list 3 of the Bachelor program for specialty "Electronics".

AIMS AND OBJECTIVES OF THE COURSE: With the lecture course, students learn about the principle of operation of sensor devices for measuring the basic physical quantities in industry, and with the known circuit solutions of the electronic transducers for signal processing from the sensors output. At the end of the course the students will be able to design sensor devices for application in management systems.

DESCRIPTION OF THE COURSE: The discipline is fundamental for the students' knowledge and skills in the field of modern sensing elements, which are applied in the electronic technological devices and various industrial fields. They become acquainted with modern circuit solutions and methods for processing signals from sensor outputs. In the lecture course are included basic primary transducers for measuring the basic physical quantities in the industry - temperature, humidity, pressure forces, fluid flow, mechanical displacements, intensity of light, etc. Students will be prepared to design the electronic circuits needed to amplify and convert signals from the sensors output.

PREREQUISITES: The discipline is based on the knowledge gained in: Physics; Electronic and semiconductor elements; Analog Circuits; Digital Circuits and Signals and Systems.

TEACHING METHODS: Lectures using a multimedia projector, laboratory exercises with protocols.

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

INSTRUCTION LANGUAGE; Bulgarian.

BIBLIOGRAPHY:
1. Ivanov S., Electronic devices for measuring non-electric quantities, Technical University of Sofia,2017; 2. Velchev N.. Metrology and Sensor, University Publishing House, Plovdiv, 1999;
1. System Applications Guide, Analog Devices, Inc., 1993, Section 14.; 4 Ramon Pallas-Areny and John G. Webster, Sensors and Signal Conditioning, John Wiley, New York, 1991.

DESCRIPTION OF THE COURSE

Name of the course **Methods, devices and Systems for data acquisition and transformation**	Code: **BE51.1**	Semester: **VII**
Type of teaching: Lectures and laboratory work, semester project	Lessons per week: L – 2 hours; LW – 2 hour	Number of credits: 5

LECTURER:
Ass. Prof. Ph.D. Boyko Baev Petrov, tel: 659760 e-mail: bpetrov@tu-plovdiv.bg
 TU-Sofia, Branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Elective subject for student's specialty "Electronics", bachelor.

AIMS AND OBJECTIVES OF THE COURSE: After subject completion the students know an organization and development of data acquisition systems methods and techniques for industrial applications and science investigations equipment.

DESCRIPTION OF THE COURSE: The main topics concern: Mathematical analysis of classical and particular digital signal processing methods: digital filters, spectrum and capstrum analysis, FFT, scanner analysis; Particular ADC: sigma-delta ADC, synchronous ADC; DCT and 2D filtering; DSP architecture and periferials. The study course material is located to the industrial, biomedical, sound and video signal processing.

PREREQUISITES: Mathematics, Physics, Signals and Systems, Digital electronic, Microprocessor and Software skills

TEACHING METHODS: Lectures, using slides, case studies, laboratory and semester project (elective), work in teams, protocols and semester project description preparation and defence.

METHOD OF ASSESSMENT: Written examination (70%), three laboratory assessments (30%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Макс, Ж., Методы и техника обработки сигналов при физических измерениях, М.: Мир, 1983, I и II. 2. Ташев, Ив., Методи, устройства и системи за събиране и преобразуване на информация, Учебник за дистанционно обучение при ТУ София. 3. Опенхайм, Ал., Сигнали и системи, С.: Техника, 1992. 4. Иванов, Р., Ив.Ташев, Б.Петров, Методи и средства за събиране и обработка на информация. Ръководство за лабораторни упражнения, ТУ София, 1993.

DESCRIPTION OF THE COURSE

Name of the course **Real-time microprocessor based applications**	Code: **BE51.2**	Semester: **7**
Type of teaching: Lectures and laboratory work semester project	Lessons per week: L – 2 hours; LW – 3 hour	Number of credits: **5**

LECTURER:
Ph.D.Boyko Petrov, assistant professor tel: 659760 e-mail: abpetrov@persecteam.com TU-Sofia, Branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Elective subject for student's specialty "Electronics".

AIMS AND OBJECTIVES OF THE COURSE: After subject completion the students know a theoretical basis, methods of development and realization of real-time microprocessor based single-devices and systems for industrial control and measuring applications.

DESCRIPTION OF THE COURSE: The main topics concern: The circumstance of real-time microprocessor based applications; Mathematical methods of function response descretization; Basic parts and their parameters determination - ADC, DAC, memory, ALU, period of sampling, type of microprocessor; Software development of real-time applications - calculations acceleration methods. The study course material is located to the industrial control and measuring applications.

PREREQUISITES: Good preparation of Mathematics, Control Theory, Signals and systems, Microprocessors and Software development skills.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and semester project (elective), work in teams, protocols and semester project description preparation and defence.

METHOD OF ASSESSMENT: Written examination (70%), three laboratory assessments (30%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. B.C.Kuo - Discrete Data Control Systems, Prentice-Hall Inc. Englewood Cliffs, New Jersey, 1991 2. Paul Katz - Digital Control using Microprocessors, Technion - Israel Institute of Technology,1991, ISBN 0-13-212191-3 3.Marc Davio, Jean-Pierre Deschamps, Andre Thayse – Discrete and Switching Functions, Advanced Book Program, Georgi Publishing Co and McGraw-Hill Inc., 1984, ISBN 0-07-015509-7. 4. Острем К., Виттенмарк Б. Системы управления с ЭВМ, Москв, Мир,1987

DESCRIPTION OF THE COURSE

Name of the course: **Analysis, modeling and design of power converters**	Code: **BE52.1**	Semester: 7
Type of teaching: Lectures, laboratory work,	Lessons per week: L – 2 hours; LW – 2 hours; SS – 5 hours.	Number of credits: **5**

LECTURER: Assoc. Prof. PhD Tsvetana Grigorova, (FEA),
e-mail: c_gr@tu-plovdiv.bg, Technical University of Sofia, Branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory eligible for the students speciality Electronics, BEng programme of FEA.

AIMS AND OBJECTIVES OF THE COURSE:
The aims and objectives of the course "Analysis, modeling and design of power converters" is to teach students on the fundamental theory for electromagnetic processes description, models, algorithms, applicable programs for analysis, modelling in the transient/steady-state mode of the electrical energy converters.
At the end of the course the students must have theoretical and practical knowledge on the main types of power electronic converters, their basic parameters and characteristics as well as methods of their investigation and computer simulation.

DESCRIPTION OF THE COURSE:
"Analysis, modeling and design of the power converters" gives the students' knowledge about bases analysis methods, investigation and design of the electrical energy converters. In view of the industrial applications and the related technical requirements of the different types of circuits, resonant DC converters are considered; specialized controllers for resonance converters control; various algorithms for controlling power devices and generating output voltage and output current in voltage-source inverters. The general principles of the modeling of power electronic devices and their realization using computers are studied.

PREREQUISITES: Knowledge on Mathematics, Theory of Electrical engineering, Semiconductor devices, Power supplies, Theory of electronic circuits, Power electronics, Analogue Electronics, Electronic regulators is necessary

TEACHING METHODS: Lectures using demonstrative materials. Laboratory assignments on laboratory manuals and protocols made by the students and checked by the lecturer, design practice for a part of the students.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (80%), laboratory works (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Григорова, Цв. Анализ, моделиране и проектиране на преобразувателни устройства. ТУ- София, 2012; 2. Анчев М., Силови електронни устройства. ТУ-София, 2019г.; 3.Rashid, M., Power electronics handbook, 2001; 4.Mohan, N. Power electronics, John Wiley & Sons, 2005; 5. Williams, B. Power Electronics - Devices, Drivers, Applications, and Passive Components, McGraw-Hill, 2002; 6. OrCad Pspice A/D Reference Manual, 2005

DESCRIPTION OF THE COURSE

Name of the course **Practical work**	Code: **BE53**	Semester: VII
Type of teaching: Laboratory work	Lessons per week: LW-2 hours	Number of credits: 1

LECTURER:

Head Assistant Rosen Bozhilov, PhD., (FEA), Dept. of Electronics,
Technical University of Sofia - Branch Plovdiv, e-mail: rossen_chi@abv.bg

COURSE STATUS IN THE CURRICULUM:

Compulsory for Bachelor's degree students majoring in Electronics at the Faculty of Electronic and Automation.

AIMS AND OBJECTIVES OF THE COURSE:

The course "Practicum" aims at providing the students with practical skills, work habits and engineering experience in analyzing, synthesizing and constructing combined with experimental realization of a particular topic, assignment or a problem studying project in the field of applied electronics.

DESCRIPTION OF THE COURSE:

By nature and specifics the classes summarize and intertwine elements of various work types such as laboratory work and course project design for a period of two semesters. They combine inherent for the engineering practice activities: literature review, catalogue and company research; analysis of solutions to a problem at the level of a block diagram; analysis and synthesis of a schematic diagram; experimental study; constructive design; development of a laboratory model; functional testing; techno-economic justification etc.

PREREQUISITES:

Good fundamental knowledge of: Signals and systems; Semiconductor devices; Analog Electronics; Digital Electronics, Measurements in Electronics, Microprocessor systems.

TEACHING METHODS:

Laboratory work, combined with practical realization of certain electronic devices. The leading lecturer works both collectively and on an individual basis with each student depending on the stage of realization of the particular tasks.

METHOD OF ASSESSMENT:

Lecturer's signature after the successful completion of the course.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: (in Bulgarian)

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. Oppenheim Al., Signals and Systems, Technica press, Sofia, 1995.

2.

DESCRIPTION OF THE COURSE

Name of the course **Telecomunications**	Code: **BE56**	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L–2 hours; LW–2 hours	Number of credits: **3**

LECTURER:

Assoc. Prof. Ph.D.. Svetoslav Ivanov (FEA), tel.: 032 659720, email: isveto@dir.bg

Technical University of Sofia, branch Plovdiv.

COURSE STATUS INTHE CURRICULUM: Compulsory for the students specialty "Electronics" of Faculty of Electronics and Automation, educational-qualification degree "Bachelor".

AIMS AND OBJECTIVES OF THE COURSE: With the lecture course, students learn about the principles of building information transfer systems. The peculiarities of channels and signals for the transmission of audio and visual information are considered; the principles of partitioning (multiplexing and demultiplexing), switching at different levels and transmission environments. Cable, fiber optic, radio relay, satellite systems and cellular telephone systems are studied.

DESCRIPTION OF THE COURSE: Main themes: Types of telecommunication networks; Integrated Services Digital Network (ISDN); Mobile connectivity networks; Digital multiplex systems; Application of delta-modulation in subscriber multiplex systems; Principles of building a radio-technical communication system; Introduction to optical communications; Light sources and receivers applicable to fiber optic connection systems; Optical couplers; Optical Receivers. Measurement of optical power; Principles of construction of a direct-line radio relay line; Principles of operation of satellite radio communication systems; Spreading of radio waves. Superheterodyne receptors.

PREREQUISITES: Good preparation in the following disciplines: Signals and Systems, Analog Circuits and Digital Circuits.

TEACHING METHODS: Lectures using a multimedia projector and demo programs, laboratory exercises with protocols.

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

INSTRUCTION LANGUAGE; Bulgarian.

BIBLIOGRAPHY:
1. Pencheva E., Introduction to Modern Telecommunication Networks, New Knowledge, Sofia, 1999; 2. Pulkov V., Multiplexing in Telecommunications, New Knowledge, Sofia, 2000; 3. Dobrev D., Radiocommunications, Part I, Ciela, Sofia, 2000; 4. Ryabov S., Optical communications, New knowledge, Sofia, 1999.

<div align="center">**DESCRIPTION OF THE COURSE**</div>

Name of the course **Sensors and transducers**	Code: **BE57.3**	Semester: **8**
Type of teaching: Lectures, Laboratory work	Hours per week: L – 2 hours, LW – 2 hours	Credits: **4**

LECTURER:

Assist. Prof. Ivan Maradzhiev, Ph.D., Department of Electronics, e-mail: iv_mar@tu-plovdiv.bg
Technical University-Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Elective course for students of specialty "Electronics" of faculty "Electronics and Automation" at the Technical University - Sofia, Plovdiv branch, educational degree "Bachelor".

AIMS AND OBJECTIVES OF THE COURSE: During the course the students acquire specialized knowledge about construction and operating principle of different types of sensors and sensor systems.

DESCRIPTION OF THE COURSE: The main topics concern: Types and classifications of sensors and control systems; Temperature sensors; Speed and acceleration measurement; Mass, torque, force and strain measurement; Optical sensors; Magnetic field sensors; Hall sensors; Electromechanical sensor;. Industrial sensors and control; MEMS sensors; GMR sensors;

PREREQUISITES: Knowledge of the following disciplines: Mathematic, Physics, Semiconductor devices, Theoretical Electrical Engineering, Analogue electronics, Microelectronics, Microprocessor techniques.

TEACHING METHODS: Lectures and laboratory exercises in properly equipped laboratories. For the laboratory exercises are developed methodical manuals, templates and laboratory models on topics, covered in the lectures.

METHOD OF ASSESSMENT: A written exam 80%, laboratory exercises 20%.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Solomon S. Sensors. Handbook M.G.Hill 2010 .ISBN9780071605717, 2. Moris A. Measurement and instrumentation. Priciples. ISBN 0750650818 2001, 3. Sensor. Technology.Handbook 2005 ISBN0750677295, 4. Webster J.G.The measurment instrmentation and sensors. CRCPress LLC1999 ISBN084932145-X, 5.Semiconductor Sensors.Daate Handbook. SC17, Philips,1989.

Name ofthecourse **Design of electronic devices**	Code:**BE57.5**	Semester: 8
Typeof teaching: Lectures and laboratoryworks	Lessons per week: L– 2 hours; SW– 1hour; LW– 2 hours.	Credits:**4**

LECTURER:

Ph.D. I. Rachev, Department of Electronic, Technical Universityof Sofia – Plovdiv branch, ph., 032/ 959 718, e-mail: ivr@tu.plovdiv.bg

COURSE STATUS INTHECURRICULUM:

Compulsoryforthestudentsspecialty "Electronics" foreducational and qualifications degree"bachelor".

AIMS ANDOBJECTIVES OFTHECOURSE:

Students gainknowledgeintheprocessesof electronicequipment manufacturing,usingknowledge ofthesubjectsofdesign,materials,and engineeringdocumentation.During thecoursestudentswillgainknowledgeandelementsof organization ofmodern productionorganization.

DESCRIPTION OF THE COURSE:

Studentslearnthebasicprocessesforobtainingand structuringofcoatings, typesofelectronicequipmentaccording toitsfunction,PCBdesigntaking intoaccountthe productionprocess,thermaldesign,electromagneticcompatibility,technical,design and technological documentationrules.

PREREQUISITES:

Electrical EngineeringTheory, Semiconductor devices, Signals and systems, physics,materialsscience, measurementelectronics.

TEACHING METHODS:

Lectures, tutorials, laboratorywork, protocols.

METHODOF ASSESSMENT: Two-hour assessment at the end ofthe semester (80 %) and laboratorywork (20%).

INSTRUCTIONLANGUAGE: Bulgarien

BIBLIOGRAPHY :

1. Йорданова Л.Конструиране, технология и надеждностна радио исъобщителната апаратура, С., изд.на ТУ-София, 1994; O. Molloyat all, Design for ManufacturingandAssembly, Springer 1998; Arnaudov, R. Videkov, V., Designand Technologyof hybrid micromodules, Softtrade,2012.

DESCRIPTION OF THE COURSE

Name of the course **Automation of electronic production**	Code: **BE57.6**	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 3 hour	Number of credits: **4**

LECTURER:

Assoc. Prof. Ph.D.. Svetoslav Ivanov (FEA), tel.: 032 659720, email: isveto@dir.bg

Technical University of Sofia, branch Plovdiv.

COURSE STATUS INTHE CURRICULUM: Compulsory for the students specialty "Electronics" of Faculty of Electronics and Automation , educational-qualification degree "Bachelor".

AIMS AND OBJECTIVES OF THE COURSE: To introduce the students to the main tasks of automation of electronic production and with the methods for control and diagnostics of electronic elements and devices. At the end of the course the student will know the basic principles for building flexible automated systems; the organizational structure of the electronic production and will have knowledge of functional diagnostics of analogue and digital electronic devices.

DESCRIPTION OF THE COURSE: The discipline is fundamental to the knowledge and skills in the field of automation of electronic production. The course covers issues related to flexible automated manufacturing systems, digital and program control, programmable logic (industrial) controllers, interfaces and local networks used for automation of production, the structure of electronic production and diagnostics of electronic products.

PREREQUISITES: Control Theory, Analog Circuits, Digital Circuits, Measurements in Electronics, Electronic control and command devices.

TEACHING METHODS: Lectures using a multimedia projector, laboratory exercises with protocols.

METHOD OF ASSESSMENT: Written exam**.** (70%), laboratory exercises (30%) .

INSTRUCTION LANGUAGE; Bulgarian

BIBLIOGRAPHY:

1. Ovcharov S., Automation of electronic production, Technics, S., 2004.
2. Stoilov G., Quality control in the electronic industry, Auto Spectrum, Plovdiv, 1998.
3. Роткоп Л, Автоматическое управление процессами массового производства, изд. "Машиностроение", Мир, 1982.
4. Dally J, W.F.Riley, K.G. McConnell, Instrumentation for Engineering easurement, J.Wiley&Sons, inc., N.Y., 1993
5. Taguchi Genichi and Yu-In Wu , Introdaction of off- Line Quality Control, Central Japan Quality Control Assoeiation.

DESCRIPTION OF THE COURSE

Name of the course: **Information systems with laser radiation**	Code: **BE58.2**	Semester: 8
Type of teaching: Lectures, laboratory work, Course project – elective	Lessons per week: L – 3hours; LW – 2 hours,	Number of credits: **5**

LECTURERS:

Assoc. Prof. Boryana Pachedjieva, PhD., (FEA) - tel.: 659708
e-mail: pachedjievaa@yahoo.com
Technical University of Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Elective for BEng students specializing in Electronics at the Faculty of Electronics and Automation.

AIMS AND OBJECTIVES OF THE COURSE:
The aim of the course is to introduce students with innovations in information systems with laser radiation and tendency of theirs development.

DESCRIPTION OF THE COURSE:
The main topics in the course concern: Kinds of information systems with laser radiation; Propagation of the laser radiation in the atmosphere; Extinction of the laser radiation; Photoelectronic transformation regime; Generalized scheme of the laser information system with atmospheric propagation canal; Algorithm for engineering design of the laser information system with atmospheric propagation canal (LISAPC); Individual and Joint Influence of Heterogeneous Stochastic Factors on Bit-Error Rate of LISAPC; Geodesic laser sysstems

PREREQUISITES: Good fundamental knowledge in the courses: Mathematics, Signals and systems, Semiconductor devices, Laser Technique.

TEACHING METHODS: Lectures, laboratory work

METHOD OF ASSESSMENT: Written exam (80%), laboratory work (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:

in Bulgarian
1. E. Ferdinandov, Laser radiation in Radio engineering, Sofia, Technique Press, 1981; 2. E. Ferdinandov, P. Pavlova, Principles of Optoelectronics – part II. Sofia, Technique Press, 1993; 3. E. Ferdinandov and others., Fiber communication systems – rarts I, II, III. Sofia, Siela, 2001, 2002, 2003; 4. M. Nenchev, S. Saltiel. Laser Technique. University press, Sofia, 1994; E. Fersinandov, B. Pachedjieva, Probabilistic and statistic methods in communications, Siela Press, Sofia, 2005; 6. E. Ferdinandov, B. Pachedjieva, K. Dimitrov. Optical communication systems – analytical descriptions, algorithms for engineering design. TU-Sofia, branch Plovdiv, 2007;

DESCRIPTION OF THE COURSE

Name of the course **Electronic Technology Devices**	Code: **BE59.1**	Semester: 8
Type of teaching: Lectures and laboratory work Course project of choice.	Lessons per week: L – 2 hours; LW – 3 hour	Number of credits: **4**

LECTURER:

Assoc. Prof. Ph.D.. Svetoslav Ivanov (FEA), tel.: 032 659720, email: isveto@dir.bg

Technical University of Sofia, branch Plovdiv.

COURSE STATUS INTHE CURRICULUM: Compulsory for the students specialty "Electronics" of Faculty of Electronics and Automation from block B, educational-qualification degree "Bachelor".

AIMS AND OBJECTIVES OF THE COURSE: The subject "Power Electronic Devices" (intelligent modules and systems) enables students to master the basic principles of action and structures of control, automatic regulation and protection of power electronic converters. Students also receive basic knowledge of physical processes in industrial electronic devices.

DESCRIPTION OF THE COURSE: Main themes: Methods for controlling step motors; DC motor control systems; Incremental speed and position measurement schemes; Control signals and drivers for control of MOSFET and IGBT transistors; Loss of power and energy in MOS controlled switch elements; Current measurement with MOS field transistor with built-in sensor and magnetostrictive matrix; Application of insulating phototransformers; Application of fiber optic interfaces in power electronic devices; Induction heating theory; Dielectric heating devices; The technique of intensive ultrasonic oscillations.

PREREQUISITES: The course of lectures and exercises is based on the knowledge of Analog Circuit Engineering, Introduction to Control Theory, Impulse and Digital Circuit Engineering, Sensor Technology.

TEACHING METHODS: Lectures using a multimedia projector, laboratory exercises with protocols.

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

INSTRUCTION LANGUAGE; Bulgarian.

BIBLIOGRAPHY:

1. Загаевский Т., Промышленная электроника, Москва, Энергия, 1976;

2. Todorov D., Converters in instrumentation, Sofia, Technics, 1992**;**

3. Арменский Е., Электрические микромашины, Москва, Высшая школа,1975.;

4. Layssy E., Fiber Optics, Sofia, Technics, 1986.