DESCRIPTION OF THE COURSE

Name of the course: **Theoretical Electrical Engineering–Part 1**	Code: **EEA03**	Semester: **3**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 30 hours S – 30 hours LW – 15 hours	Number of credits: **8**

LECTURER(S):
Assoc. Prof. Eng. Nikola Georgiev PhD (FEA), tel.: 659592, e-mail:nikola.georgiev@tu-plovdiv.bg
Principal Assistant Eng. Vasilina Zlatanova PhD (FEA), tel.: 659535, e-mail: w_zlatanova@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major of Electrical Engineering and Automation, Information and Control Engineering of the Electrical Engineering and Automation Faculty, full-time and part-time students, Bachelor of science.

AIMS AND OBJECTIVES OF THE COURSE: Theoretical Electrical Engineering – part 1 is a fundamental subject and introduces the basic laws and phenomena of electromagnetism and the approaches applied to describe the processes in linear and nonlinear electric and magnetic circuits and with the methods of analysis on these processes in constant, stationary and unfixed modes..

DESCRIPTION OF THE COURSE: The subject aims at introducing students to the electromagnetic theory; the laws applied in analysis on electric and magnetic circuits, and investigation of sinusoid fixed modes, equivalent transformations; methods and theorems of analysis on linear electric circuits; resonance phenomena; linear electric circuits with inductive connections; research on periodic non-sinusoid modes in linear electric circuits; passive and active quadripolars; circuits with distributed parameters..

PREREQUISITES: The course of lectures and seminars is based on students' knowledge of Mathematics and Physics.

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: Exam with three questions (60% in total) and two assignments (20%), course work (20%)

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1.Генов Л., Теоретични основи на електротехниката, София, Техника, 1991; 2. Фархи С., С. Папазов. Теоретична електротехника, ч.1, Техника, С., 1990; 3. Георгиев Н.,Теоретична електротехника, Пловдив, Макрос, 2015; 4.Георгиев Н., В. Кирчев, Ръководство за семинарни упражнения по теоретична електротехника. ТУ София, филиал Пловдив, 2012; 5.Георгиев Н., В. Кирчев, Ръководство за лабораторни упражнения по теоретична електротехника. ТУ София, филиал Пловдив, 2008.

DESCRIPTION OF THE COURSE

Name of the course: **Electrical measurements**	Code: **EEA04**	Semester: **3**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 30 hours S – 0 hours LW – 30 hours	Number of credits: 6

LECTURER(S):
Assoc. Prof. Eng. Misho Matsankov, PhD (FEA), tel.: 032 659 686 e-mail: mishel@tu-plovdiv.bg
Asist. Prof. Eng. Nikolay Paunkov PhD(ФЕА), tel.: 0896 847 308, e-mail: nick123@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course from the curricula for training students for Bachelor's degree, specialty, "Electrical Engineering", "Design and Programming of Electronic Systems" and "Automation information and control engineering" in the professional field 5.2 Electrical Engineering, Electronics and Automation, field 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course students will acquire knowledge and skills about the basic technical means and methods for measuring electrical, magnetic and non-electrical quantities, as well as questions about processing and metrological evaluation of measurement results in the presence of systematic, gross and random errors. In accordance with their personal interests, students should know how to find the necessary information in this field.

DESCRIPTION OF THE COURSE: The main topics covered in the teaching of the discipline are: Measuring instruments. Measures and standards, Processing of measurement results, Measuring transducers, Measuring amplifiers, Measuring electrical quantities and expanding the range of measuring instruments. Measurement of some non-electric quantities.

PREREQUISITES: Knowledge and skills in the disciplines Mathematics, Physics, Theoretical Electrical Engineering.

TEACHING METHODS: Lectures using slides and demo programs, laboratory exercises with protocols.

METHOD OF ASSESSMENT: Written exam. The final grade is formed according to a point system. Average over 60 points; good over 70 points; very good over 80 points; excellent over 90 points. The main part of the points are formed by the test during the exam, lasting two hours, maximum 90, and the remaining 10 based on the student's work during the semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1 Основна литература 1. Колев Н.,Лазаров и др. - Електрически измервания, ТУ,2000; 2. Колев Н. и колектив, Електрически измервания, ТУ-София 1993г; 3. Рангелова В, Записки лекции по Елелктрически измервания, Пловдив 2018, 5. Божков Ст., М. Мацанков, Ръководство за ЛУ по електрически измервания, ТУ-София 2015г.; 7. Рангелова В., Н. Паунков, М. Мацанков, Ръководство за ЛУ по електрически измервания, Пловдив 2019г., 8. Мацанков М. Ст. Божков, Ръководство за ЛУ по измерване на неелектрически величини, ТУ-София 2017г. Допълнителна литература 1. P. Mlakovati “Misure elettriche” 2014г; 2. Mlakovati “Misure indistriali con strumenti analogici ” Iniversita di Pavia 2019

ХАРАКТЕРИСТИКА НА УЧЕБНАТА ДИСЦИПЛИНА

Name of the course: **Mechanical systems**	Code: **MEC23**	Semester: **3**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L –30 hours LW – 15 hours	Number of credits: **5**

Lecturers:

Assist. Prof. Dimitar Dimitrov, PhD, Faculty of Mechanical Engineering, Tel. 659 662, email: ddimitrov_tu@abv.bg,
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM:

Compulsory 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: The main objective of the course is to give students fundamental knowledge on the methods of analysis and synthesis of mechanisms and mechanical systems. The methods, criteria and algorithms of calculating of rational constructions of parts and constructions of common use.

DESCRIPTION OF THE COURSE: Main topics of the course: Structure and classification of the different mechanisms. Analysis of the kinematic and dynamic forces in elementary and contour mechanisms. Gears. Chain, friction and belt gears. Types of mechanical joints-detachable and non-detachable.Joints-shaft-hub.Linking elements. Shafts and axles. Springs. Dynamic and electromechanical systems.

PREREQUISITIES: Knowledge of Mechanics

TEACHING METHODS: Lectures, delivered through slide and multimedia presentations, laboratory exercises using computers.

METHODS OF ASSESSMENT: In class assessment

LANGUAGE OF INSTRUCTION: Bulgarian

RECOMMENDED READING:

1. Lecture notes – study materials, published on https://e-learning.tu-plovdiv.bg , updated every year.;
2. Генова П., и др., Машинни елементи и механизми, С., 1991.;
3. Андонов А., Ръководство за курсово проектиране и лабораторни упражнения по “Машинни елементи и механизми”, 2003.;
4. Минчев Н., и др., Теория на механизмите и машините, С., Техника, 1991.
5. Николов Н., и др., Ръководство за конструктивни упражнения по “Машинни елементи”, С., Техника, 1992.;

DESCRIPTION OF THE COURSE

Name of the course: **Semiconductor devices**	Code: **EEA05**	Semester: **3**
Type of teaching: Lectures (L) Laboratory work (LW	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER(S):
Assist. Prof. Eng. Ivan Maradzhiev, PhD (FEA), tel.: 032 659776, e-mail: iv_mar@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory from the curricula of students to obtain Bachelor's degree, specialty Design and programming of electronic systems; Electrical engineering; Automation, Information and Control Engineering, 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 know the structure and principle of operation of the basic semiconductor Devices.

DESCRIPTION OF THE COURSE: PN Junction. Semiconductor Diodes. Bipolar Junction Transistors. Thyristors. FET Transistors. IGBTs. Optoelectronic Devices.

PREREQUISITES: Physics. Materials. Electrical Engineering.

TEACHING METHODS: Lectures. Laboratory work.

METHOD OF ASSESSMENT: Exam (70%), laboratory work (30%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Христов, М.. Полупроводникови елементи, Нови знания, 2007; 2. Дандаров, А. Оптоелектрони пробори и интегрални схеми, ТУ-София, 1991; 3. Вълков, С., Ямаков И., Дойчинова. Електронни и полупроводникови елементи и интегрални схеми, Техника, 2000; 4. Ямаков И., Дойчинова Р, Христов М. Електронни и полупроводникови прибори и интегрални схеми, С, Техника, 1987; 5. Thomas L. Floyd, Electronic devices, 1988.

DESCRIPTION OF THE COURSE

Name of the course: **Electronic circuits theory**	Code: **EEA06**	Semester: **3**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER(S):
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: Compulsory subject from the curricula for training of students to obtain Bachelor's degree, specialties "Electrical Engineering", "Design and programming of electronic systems" and "Automation, Information and Control Systems", Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The course "Electronic Circuits theory" is designed to provide students with opportunities to study modern methods for modelling, analysis and synthesis of analog electronic circuits and to form practical skills for solving engineering problems, analysis and validation of results using specialized systems for automated design (PSpice for TI, LTspice).

DESCRIPTION OF THE COURSE: The training in the discipline is divided into the following sections: methodology of a functional design of electronic circuits; the properties of one-port devices and two-port networks as components of active electronic circuits, as well as their mathematical and physical models; methods for sensitivity analysis of electronic circuits; dependencies for determining the transfer functions of the circuits. Based on the comparison, attention is focused to the methods for approximation of the transmission characteristics of linear electronic circuits. In addition, some basic types of electric filters (K-type filters, non-inductive filters, active filters, etc.) are considered. Thus, at the end of the training, the student will know the methods for analysis and numerical simulations of electronic circuits.

PREREQUISITES: Mathematics, Electronic and semiconductor devices, Theory of electrical engineering.

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

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

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Шойкова Е., С. Цанова, Д. Колев. И. Пандиев, Методология за проектиране на електронни схеми с PSpice, ТУС, 2000, ISBN 954-9952-17-7; 2.Тодоров, Т., Методически указания по теория на електронните схеми, ТУС, 2014, ISBN 978-619-167-075-8; 3. Шойкова Е., Синтез на активни филтри, ТУС, 2000, ISBN 954-9952-19-3; 4. Шойкова Е., С. Цанова, Д. Колев, И. Пандиев, Методология за проектиране на електронни схеми с PSpice, ТУС, 2000; 5. Fitzpatrick, D., Analog Design and Simulation using OrCAD Capture and PSpice, Elsevier Ltd.,Oxford, 2012; 6. Raut R, M. Swamy., Modern Analog Filter Analysis and Design, 2010 WILEY-VCHVerlag & Co. KGaA, Weinheim, Germany, ISBN 978-3-527-40766-8.

DESCRIPTION OF THE COURSE

Name of the course: **Sport**	Code: **SPR03**	Semester: 3
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):
Sen. Lect. Daniel Vladimdirov, 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_spassov@tu-plovdiv.bg
Technical University of Sofia-Branch Plovdiv
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curricula for training of students to obtain Bachelor's degree, specialty "Automation, Information and Control Systems", "Electrical Engineering", "Electronics" 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 and "Pass grade".

INSTRUCTION LANGUAGE: Bulgarian

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

DESCRIPTION OF THE COURSE

Name of the course: **Theoretical Electrical Engineering–Part 2**	Code: **EEA07**	Semester: **4**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 30 hours S – 30 hours LW – 15 hours	Number of credits: **7**

LECTURER(S):
Assoc. Prof. Eng. Nikola Georgiev PhD (FEA), tel.:659592, e-mail:nikola.georgiev@tu-plovdiv.bg
Principal Assistant Eng. Vasilina Zlatanova PhD (FEA), tel.: 659535, e-mail: w_zlatanova@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major of Electrical Engineering and AIUT of the Electrical Engineering and Automation Faculty, full-time and part-time students, Bachelor of science.

AIMS AND OBJECTIVES OF THE COURSE: The subject Theoretical Engineering – part 2 is fundamental that introduces the students in the major of Electrical Engineering to the basic laws and phenomena of electromagnetism, to the approaches to describe the processes in linear and nonlinear electric and magnetic circuits, and to the methods of analyzing these processes in constant, stationary and non-stationary modes. The basic problems of the electromagnetic field are treated..

DESCRIPTION OF THE COURSE: The subject aims at introducing students to the theory and analysis of three-phase electric circuits, the methods to analyze the transient processes in linear electric circuits and the transient processes in circuits of distributed parameters, introduction to the analysis of non-linear electric circuits and some fundamental issues of the theory of electromagnetic field

PREREQUISITES: The course of lectures and laboratory work is based on the students' knowledge of Mathematics, Physics, Programming and Computer Utilization and Theoretical Electrical Engineering – part 1.

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: Exam with three questions (60% in total) and two assignments (20%), course work (20%)

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1.Генов Л., Теоретични основи на електротехниката, София, Техника, 1991; 2. Фархи С., С. Папазов. Теоретична електротехника, ч.1, Техника, С., 1990; 3. Георгиев Н.,Теоретична електротехника, Пловдив, Макрос, 2015; 4.Георгиев Н., В. Кирчев, Ръководство за семинарни упражнения по теоретична електротехника. ТУ София, филиал Пловдив, 2012; 5.Георгиев Н., В. Кирчев, Ръководство за лабораторни упражнения по теоретична електротехника. ТУ София, филиал Пловдив, 2008.

DESCRIPTION OF THE COURSE

Name of the course: **Programming and Tools for Mathematical Modelling**	Code: **CCE27**	Semester: **4**
Type of teaching: Lectures (L) Laboratory work (LW) Course Work (CW)	Hours per semester: L – 15 hours S – 0 LW – 30 hours	Number of credits: **4**

LECTURER(S):
Assoc. Prof. Sevil Ahmed-Shieva, PhD (FEA) tel.: 032 659 583, e-mail: sevil.ahmed@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for training of students to obtain Bachelor's degree, specialties of "Automation, Information and Control Engineering" and "Electrical Engineering", 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 are expected to be able to apply the methodology for modelling, validation and simulation of real systems and processes, to have basic knowledge on programming in C and MATLAB and the MATLAB/Simulink simulation software.

DESCRIPTION OF THE COURSE: The course emphasizes the importance of programming of industrial systems, as well as the need for their modeling as a stage of the design process (rapid prototyping) and implementing. In this regard, the skills for using the C and MATLAB programming languages and the specialized MATLAB/Simulink tools for creating real-time applications are being developed. Special attention is paid to the mathematical modeling of dynamical systems in the environment of MATLAB/Simulink.

PREREQUISITES: Control Theory, Mathematics I, Mathematics II, Programming I, Physics, Mechanics.

TEACHING METHODS: : Lectures, visually illustrated; laboratory exercises with preparation of laboratory reports/protocols.

METHOD OF ASSESSMENT: Written exam at the end of the semester (80%) and course work defence (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Mark M. Meerschaert, Mathematical Modeling, Michigan State University Elsevier Science, 2007, ISBN: 978-0-12-370857-1; 2. Vladimir Mityushev, Wojciech Nawalaniec, Natalia Rylko, Introduction to Mathematical Modeling and Computer Simulations, Chapman & Hall/CRC, 2018, ISBN: 978-1-138-19765-7; 3. Иван Гарванов, Магдалена Гарванова, Въведение в MATLAB и SIMULINK, УниБИТ, 2014, ISBN 978-619-185-121-8; 4. ПРЕСЛАВ НАКОВ, ПАНАЙОТ ДОБРИКОВ, ПРОГРАМИРАНЕ = ++АЛГОРИТМИ. СОФИЯ: TOP TEAM CO, 2003; 5. ШИЛДТ, Х., ПРАКТИЧЕСКИ САМОУЧИТЕЛ С. СОФТ ПРЕС, 2001, ISBN: 954685168X

DESCRIPTION OF THE COURSE

Name of the course: **Automatic Control Theory**	Code: **EEA08**	Semester: **4**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours S – 0 hours LW – 30 hours	Number of credits: 5

LECTURER(S):
Assoc. Prof. PhD and DSc Borislav Penev, tel.: 032-659-527, e-mail: bpenev@tu-plovdiv.bg
Assist. Prof. Vasil Popov, PhD (FEA), tel.: 359 896282030, e-mail: vasil_popov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialties: "Automation, Information and Control Engineering", "Electrical Engineering", Professional orientation 5.2 "Electrical Engineering, Electronics and Automation", General Engineering, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to know the basic concepts of the Automatic Control Theory and be able to apply the principles, modelling and methods of the control theory in order to analyze and synthesize automatic control systems. For that purpose the students are expected to be able to use MATLAB and SIMULINK.

DESCRIPTION OF THE COURSE: The main topics concern: Automatic control systems – introduction; Mathematical models of the linear continuous automatic controls systems: Differential equations, Transfer functions, Block diagrams; Time and frequency domains analysis; Stability: Main definitions; Algebraic and Frequency criteria. Stability margins; Performance; Synthesis – classical methods; Discrete systems: Sampling and modeling; Stability.

PREREQUISITES: Mathematics part I and II, Physics, Mechanics, Theoretical Electrical Engineering Part I and II.

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

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

INSTRUCTION LANGUAGE: in Bulgarian

BIBLIOGRAPHY: 1. Ищев, К., Теория на управлението, ТУ-София, София, 2002; 2. Ищев, К., Теория на автоматичното управление, ТУ-София, София, 2007; 3. Åström, K. J. and Murray, R. M., Feedback Systems, Princeton University Press, Princeton, New Jersey 08540, 2009; 4. Ищев, Ал., Т. Пулева, Ръководство за лабораторни упражнения по теория на управлението (част1), ТУ-София, 2005.

DESCRIPTION OF THE COURSE

Name of the course **Digital Circuitry**	Code: **EEA09**	Semester: **4**
Type of teaching: Lectures (L) Laboratory work (LW) Course project (CP)	Hours per semester: L – 30 hours LW – 30 hours CP - (**EEA10**)	Number of credits: **5** (Number of credits: **2**)

LECTURER:
Prof. Eng. Galidiya Petrova, PhD (FEA), tel.: 659 576, e-mail: gip@tu-plovdiv.bg,
Technical University of Sofia, Plovdiv branch, Deptartment of Electronics

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Electronics, Electrical Engineering, Automation, information and control engineering, Professional orientation 5.2 Electrotechnic, electronics and automation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to have basic knowledge on theoretical and practical aspects of digital electronic and pulse circuits together with the methods for their synthesis and analysis and use them in solving of engineering problems.

DESCRIPTION OF THE COURSE: The main topics concern: Logical function and methods for description and minimization; Digital circuits and methods for their synthesis and analysis together with basic principles for building more complex digital units; Basic elements of digital electronics, combinational circuits - multiplexer, decoders, code converters, binary adders, digital comparators. Main types of flip-flops: RS, D, JK, T. Synchronous and asynchronous flip-flops. Applications of sequential elements: registers, shift registers, counters, etc. Practical consideration of sequential logic design; Indicator elements and digital circuits for their control; Design and working principles of relaxation circuits, mono-vibrators and multi-vibrators; DAC, ADC and S/H devices – their basic characteristics and operation;
With laboratory work it is intended to provide the students with practical skills for designing, investigating, testing and evaluating the performance of digital circuits and devices.

PREREQUISITES: Good fundamental knowledge in the courses: Theoretical electrotechnic, Semiconductor electronic elements, Theory of electronic circuits.

TEACHING METHODS: Lectures using multimedia presentations, laboratory exercises with protocols containing experimental results. Course project with description for designing a digital device with a specific functional purpose.

METHOD OF ASSESSMENT: 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%) and work on laboratory exercises (20%).

INSTRUCTION LANGUAGE: in Bulgarian

BIBLIOGRAPHY:

1. Mihov G., Digital electronics for BSc students in Electronics, Technical University – Sofia press, 1998; 2. Spasov, Gr., D. Petrova, A. Kostadinov. Digital and microprocessor technology. TU-Sofia, 2012; 3. Konov K., Pulse and digital circuits with integral TTL elements, I and II part, Technica press, 1988; 4. Storey Neil. Electronics, A System Approach, UK Addison Weslly, 1992.

DESCRIPTION OF THE COURSE

Name of the course: **TELECOMMUNICATION SYSTEM FUNDAMENTALS**	Code: **CCE28**	Semester: **4**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 30 hours S – 0 hours LW – 15 hours	Number of credits: **4**

LECTURER(S):
Assist. Prof. Eng. Stoyan Avramov, PhD, TATT (FMU), e-mail: stav@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 "Electrical Engineering" and "Automation, information and control engineering", Professional orientation 5.2 - Electrical Engineering, Electronics and Automatics, Field 5 - Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to have a comprehensive knowledge about the basic communication and data networking and communication systems. Students have to be able to use different methods for analysis, modelling and design of modern communication and data networks and system. According their professional needs to be able to teach and obtain new knowledge and skills in this professional area.

DESCRIPTION OF THE COURSE: The main topics concern: Telecommunication networks classification, Basic digital data networking. OSI reference model for open data networks. Physical communication layers and media access protocols. Parallel and serial data transfers. Synchronous and asynchronous data protocols. Digital signal modulation techniques. Data network topologies. Digital networks classification. Telecommunication networks architecture - Repeater, Hub, Switch, Transceiver, Bridge, Router, Gateway. Ethernet, MAC, IP, TCP/IP. Addresses and routing. Internet protocols and services, Wireless data transfer – WAP, Bluetooth, ZigBee, LoRa, WiFi. Transmition security, communication and information security.

PREREQUISITES: Basic knowledge of Mathematics, Physics, Electrical engineering, Signals and Systems, Analog and Digital Circuits.

TEACHING METHODS: Lectures, using slides. Laboratory work in teams with instructions for measurements. Mathlab and Simulink computer tasks for modelling and simulations.

METHOD OF ASSESSMENT: Two test assessments at mid and end of semester (75%), laboratories (25%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: Делян Генков, ОСНОВИ НА КОМПЮТЪРНИТЕ МРЕЖИ, 2014, ISBN 978-619-7071-61-0; Джиев Ст., Индустриални мрежи за комуникация и управление, ISBN 954-438-360-3, ТУ-София, 2003.; Roger L. Freeman, Telecommunication System Engineering, 2004, John Wiley & Sons, ISBN 0-471-45133-9.

COURSE CHARACTERISTICS

Course title: **Practicum**	code: **PRC02**	Semester: 4
Type of teaching: Seminars, Laboratory Works and Self Study	Lessons per week: S – 0 hours LW – 0 hours SS – 6 hours	Number of credits: 2

LECTURER:
Assistant. Prof. Vasil Popov, PhD, phone +359 896282030, vasil_popov@tu-plovdiv.bg
Technical University of Sofia- branch Plovdiv, Faculty of Electronics and Automation.

COURSE STATUS IN THE CURRICULUM: Compulsory subject for full-time students of specialties "Automation, Information and Control Systems" at FEA of TU-Sofia, Plovdiv Branch.

AIMS AND OBJECTIVES OF THE COURSE: The students have to achieve a practical knowledge and basic concepts about technological environment of electrical engineering, automation, information and control systems. The students have to reach a general and specific technological processes and methods, used in modern electrical and control industry. The practical exercises have to form visual and sense perception about used materials, electronic and electromechanical elements, electrical equipment, machines and technologies.

DESCRIPTION OF THE COURSE: The students get knowledge about some technological processes in manufacturing of electrical equipment, control systems and electronics. Some typical applications of electrical and control equipment in industrial technological processes are discussed. Students get experience in usage of electric devices, technical documentation, electric equipment and tools.

PREREQUISITES: Required knowledge of Physics, Chemistry, Materials Science, Technical Documenting.

TEACHING METHODS: seminars, laboratory work.

METHOD OF ASSESSMENT: Certification of a completed course of laboratory works is required.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY:

1. Динев П. Технологичен практикум. С., 2002.
2. Динев П. и колектив, Ръководство по технологичен практикум. С., 2004.
3. Видеков В. и колектив, Ръководство за семинарни упражнения по технологичен практикум. С., 2006.
4. W. Durfee, Arduino Microcontroller Guide,University of Minnesota, 2011.
5. Масларов И., Шопов Й. Технологии в електротехниката и електрониката. С., 2005.
6. Русев Д., Матраков Б. Туренков В. Електрически измервания, Техника 2006.
7. Николов Е., Технически средства за автоматизация, С., ТУ, 2003 г.

DESCRIPTION OF THE COURSE

Name of the course: **Sport**	Code: **SPR04**	Semester: 4
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):
Sen. Lect. Daniel Vladimdirov, 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_spassov@tu-plovdiv.bg
Technical University of Sofia-Branch Plovdiv
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Automation, Information and Control Engineering", "Electrical Engineering", "Electronics" 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 and "Pass grade".

INSTRUCTION LANGUAGE: Bulgarian

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