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 "Design and Programming of Electronic Systems" 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, the theory and analysis of three-phase electric circuits, the methods to analyze the transient processes in linear electric circuits.

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 technology" 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, Design and programming of electronic systems and Electrical Engineering, Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences .

AIMS AND OBJECTIVES OF THE COURSE: 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)/ Tutorials (T) Self-Study (SS)	Hours per semester: L – 0 hours T – 0 hours SS – 30 hours	Number of credits: 1

LECTURER(S):
Sen. Lect. Daniel 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

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", "Design and programming of electronic systems" Professional orientation 5.2 Electrical Engineering, Electronics and Automation, Field 5 Technical Sciences.

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

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

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

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

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

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

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

COURSE DESCRIPTION

Course Title: **Foreign Language II**	Code: **FaLNG02**	Semester: **2**
Type of Teaching: Tutorials (T)	Contact hours per semester: T – 30 hours	Number of credits: **2**

LECTURERS:	**Telephone:**	**E-mail:**
Sen. Lect. Konstantina Nyagolova (FME, English)	0887276513	konstantinanik@yahoo.com
Sen. Lect. Nadya Popova (FME, English)	032 659 707	popovanadia@yahoo.com
Sen. Lect. Anet Arabadjieva (FME, English)	0892231353	anet2003@abv.bg
Lect. Nadezhda Geshanova (FME, English)	0889314932	geshanova@tu-plovdiv.bg
Lect. Dr Daniela Valeva, (FME, English)	0897899039	daniela.valeva89@gmail.com

COURSE STATUS IN THE CURRICULUM: Optional course in 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.

COURSE OBJECTIVES: The course is targeted at further developing of students' language knowledge and practical skills in their specific professional field.

COURSE DESCRIPTION: The course is taught at language levels determined through placement tests, based on the compulsory foreign language course taken in Semester 1 at TU – Sofia. No absolute beginner groups are formed. The course focuses on the further development of the four language skills in the domain of the students' major subject *Electronics*.

PREREQUISITES: Completed compulsory foreign language course **LNG01** in Semester 1.

TEACHING METHODS: Seminars targeted at further development of the four language skills through individual and team work using audio and video, as well as multimedia.

METHOD OF ASSESSMENT: Evaluation is based on continuous assessment and students get a grade at the end of the course.

LANGUAGE OF INSTRUCTION: English

LITERATURE RECOMMENDED:

1. *English for Electronics, Oxford University Press*
2. *Technical English, Pearson Longman*

DESCRIPTION OF THE COURSE

Name of the course: **Analog electronics**	Code: **EEA11**	Semester: **4**
Type of teaching: Lectures(L) Laboratory work (LW)/Tutorials (T) Course work (CW)	Hours per semester: L – 30hours T– 0 hours LW – 30 hours	Number of credits: **6**

LECTURER(S):
Assist. Prof. Eng. Ivan Maradzhiev, PhD (FEA), tel.: 032 659 776, e-mail: iv_mar@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, specialty Design and programming of electronic systems, Professional orientation 5.2 Electrical engineering, electronics and automation, General Engineering, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: he course introduces in the fundamentals of electronic amplifiers. The aim of the course is to give the students knowledge of analysis and design of the analog amplifiers and generators.

DESCRIPTION OF THE COURSE: The basics of the analysis and design of the analogue electronic circuits and systems are covered: Schematics and principle of operation of the basic amplifier circuits with bipolar and MOS transistors, Principle of the feedback, Basic circuits for bipolar and MOS analogue integrated circuits, Operational amplifiers (op amps) – basic definitions, electrical characteristics, parameters and op amps applications, Active filters, Power amplifiers, Signal oscillators, High frequency amplifiers and mixers.

PREREQUISITES: Mathematics, Physics, Electrical Engineering Theory, Semiconductor devices, Signals and systems.

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: The achievement of the set goal of training in the discipline is controlled by a final assessment, which is formed by the written exam assessment (60% in total), taking into account the developed course work (30%) and the assessment from the laboratory exercises (10%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. И. Пандиев, Аналогова схемотехника. София: Издателство на ТУ-София, 2021.; 2. Л. Доневска, Д. Стаменов, И. Пандиев, К. Аспарухова и П. Якимов. Ръководство за лабораторни упражнения по аналогова схемотехника. София: Издателство на ТУ-София, 2003. 3. И. Пандиев. Ръководство за курсово проектиране по аналогова схемотехника. ТУ-София, 2022.; 4. И. Пандиев, Сборник от задачи по аналогова схемотехника. София: Издателство на ТУ-София, 2008.; 5. Floyd T. Electronic devices, Pearson, 2018, ISBN-10: 9781292222998, ISBN-13: 978-1292222998; 6. V. Tietze and Ch. Schenk. Electronic circuits. 2nd Edition. New York. Springer-Verlag, 2008.; 7. A. Sedra, K. Smith, T. Carusone, V. Gaudet. Microelectronic circuits. Eighth edition. Oxford, New York: Oxford University Press, 2020.

DESCRIPTION OF THE COURSE

Name of the course: **Programming 2**	Code: **CEE29**	Semester: **4**
Type of teaching: Lectures(L) Laboratory work (LW) Course work (CW)	Hours per semester: L – 30hours LW – 30 hours	Number of credits: **6**

LECTURER(S):
Assoc. Prof. Eng. Dilyana Budakova, PhD (FEA), tel.: 965 0895587539, e-mail: dilyana_budakova@tu-plovdiv.bg; dilyana_budakova@yahoo.com
Technical University of Sofia

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

AIMS AND OBJECTIVES OF THE COURSE: The aim for the students is to learn and be able to apply the approaches, methods and technical means and the basic principles of a structured approach in programming. At the end of the course the students will: be acquainted with the principles of work of the pre-processor; know how to create, maintain and process binary and text files; know the principles of creating and using new types in C language; have knowledge of programming at a low level - working with individual bits and inclusion of assembly language programs; know the principles of working with data structures for the realization of basic algorithms in programming.

DESCRIPTION OF THE COURSE: The main topics concern: C pre-processor. C Program structure. Inclusion of files. Macros and functions. Conditional compilation. Pointers. String search algorithms. Working with dynamic data. Dynamic one-dimensional arrays, arrays of pointers. Sort arrays of strings. Build a dictionary. Recursion. Recursion and iteration. Extended work with structures and union. Working with binaries. Separate compilation. Data structures. Static and dynamic implementation of basic algorithms - stack, queue, single-linked lists. Concept of trees and graphs. Low level programming. Bitwise operations. Household fields. Low level programming. Concept of assembler. Building an interface for including an assembly program in C, etc.

PREREQUISITES: Introduction to programming.

TEACHING METHODS: Lectures, using slides, case studies, laboratory, work in teams, protocols.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (62%), laboratories (18%), course work (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1.P. Nakov, P. Dobrikov, Programming = ++ Algorithms ;, Top Team Co, Sofia, 2002. 2. P. Nakov, Fundamentals of Computer Algorithms, Top Team Co, Sofia, 1998. 3. Nicklaus Wirth, Algorithms + Structures of data = programs, Technique, Sofia, 1980. 4. B. Kernigan, D. Richie, Programming language C, Prentice Hall, 2002.

DESCRIPTION OF THE COURSE

Name of the course: **Electromechanical Systems**	Code: **EEA12**	Semester: **4**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **4**

LECTURER(S):

Assoc. Prof. Eng. Ivan Hadzhiev, PhD (FEA), tel.: 032 659-686,
e-mail: hadzhiev@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Mandatory course from the curriculum for training students for the Bachelor's Degree in speciality "Design and Programming of Electronic Systems", professional field 5.2 Electrical Engineering, Electronics and Automation, area 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to familiarize the students with the structure, principle of operation, the types and the characteristics of the electromechanical devices and systems, used in electronics, electrical engineering, mechanical engineering, etc.

DESCRIPTION OF THE COURSE: Main topics: Electrical contact; Electric arc and conditions for its extinguishing; Electromagnetic mechanisms - structure, action, traction forces of DC and AC electromagnets; Electrical control and protection devices; Transformers - structure and principle of operation, basic equations, equivalent circuits, operating modes; General questions from the theory of alternating current electrical machines; Asynchronous machines and synchronous machines - structure and principle of operation, equations, equivalent circuits, operating modes, features; Direct current machines - structure and principle of operation, equations, equivalent circuits, operating modes, characteristics; Special electrical machines and apparatus.

PREREQUISITES: Mathematics, Physics, Theoretical Electrical Engineering, Electrical Measurements, Semiconductor Elements.

TEACHING METHODS: Lectures and laboratory exercises. The lectures are delivered using multimedia. For each laboratory exercise, the students develop an individual protocol, which is defended before the leading lecturer.

METHOD OF ASSESSMENT: Laboratory exercises (25%) and ongoing assessment (75%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Dinov V., St. Shishkova, Electrical machines – part I, Plovdiv, 2002; 2. Dinov V., St. Shishkova, Electrical machines – part II, Plovdiv, 2005; 3. Mihov M., Control of electromechanical systems, Sofia, 2011; 4. Bozhilov G., E. Sokolov, Il. Vaklev, Electromechanical devices, Technology, Sofia, 1991; 5. Angelov A., D. Dimitrov, Electrical machines – part I, Technology, 1976; 6. Angelov A., D. Dimitrov, Electrical machines - part II, Technology, 1988; 7. Popadiin St., Electrical micromachines, Technology, 1970; 8. Penchev P. and colleagues, Electrical devices, Technology, 1976; 9. Aleksandrov, A., Electrical devices, Sofia, 2004; 10. Dimitrov D. and colleagues, Manual for testing electrical machines, Technika, 1991; 11. Vaklev I., M. Stoyanov, Manual for laboratory exercises on electromechanical devices, Technika, 1990; 12. Maslarov I., St. Shishkova, Manual for laboratory exercises on electrical machines and devices, Plovdiv, 2000;13. Grossner, N., "Transformer for Electronic Circuits." McGraw-Hill, New York, 1967; 14. Colonel Wm., T. McLyman, Transformer and inductor design handbook, Marcel Dekker, Inc. 2004; 15. ABB, Three-phase asynchronous motors Generalities and ABB proposals for the coordination of protective devices, Technical Application Papers No.7, 2008; 16. Valchev V. C., A. Van den Bossche, Inductors and transformers for power electronics, Taylor & Francis, 2005; 17. Hamid A. Toliyat, Gerald B. Kliman, Handbook of Electric Motors, 2018.

DESCRIPTION OF THE COURSE

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

LECTURER(S):

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

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Electrotechnic, Automation, information and control equipment, 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: 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: **Signals and Systems**	Code: **CCE30**	Semester: **4**
Type of teaching: Lectures(L) Laboratory work (LW)	Hours per semester: L – 30hours LW – 30 hours	Number of credits: **4**

LECTURER(S):

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

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Design and programming of electronic systems, Professional orientation 5.2. Electrical Engineering, Electronics and Automation, 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 methods for analysis, synthesis and signal processing and investigation of systems in time, frequency and Laplace domains; to know principles of basic types of modulations and its applications in telecommunications, to have basic knowledge of information theory.

DESCRIPTION OF THE COURSE: The main topics concern: Spaces of signals; Bases; Fundamental input signals; Description of signals in time domain: adding approach and approach with time windows; Fundamentals of spectrum analysis: Forms of Fourier Series, Properties of Fourier transform and complex amplitudes for rational solving problems about spectrum analysis; LTI continuous and discrete systems; Laplace transform and its applications for analyzing circuits; System functions; Pole-zero diagram; Analogue and digital methods for radio signal creation; Spectra of AM, FM and PAM signals; Applications of modulations. Formatting analogue signals: sampling, quantization, coding of quantized signals; Using MATLAB for spectrum analysis; z-transform; Basics of information theory: information quantity, entropy; Coding source theorem and algorithms for optimal coding.

PREREQUISITES: Mathematics I, Mathematics II, Physics, Electrical Engineering I.

TEACHING METHODS: Lectures with multimedia projector. Solving practical problems on lectures and laboratories.

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

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Ненов Г., Сигнали и системи, Нови знания, София, 2008, ISBN 978-954-9315-87-5; 2. Опенхайм А., А. Уилски, Я. Йънг, Сигнали и системи, София, Техника, 1993, ISBN 954-03-0147-5; 3. Стефанова К., Б. Коен, И. Петров, Ръководство за лабораторни упражнения по сигнали и системи, Изд. на ТУ-София, София, 2008, ISBN 978- 954-438-732-7.

DESCRIPTION OF THE COURSE

Name of the course: **Practicum**	Code: **PRC02**	Semester: **4**
Type of teaching: Lectures(L) Laboratory work (LW)/Tutorials (T) Course work (CW) Extra-audit employment (EAE)	Hours per semester: L – 0hours T– 0 hours LW – 0 hours EAE – 60 hours	Number of credits: 2

LECTURER(S):
Assist. Prof. Eng. Dimitar Yankov, PhD (FEA), tel.: 032 659 776, e-mail: d.yankov@tu-plovdiv.bg
Technical University of Sofia, branch Plovdiv

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

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is for students to acquire practical knowledge and skills for designing, programming and assembling prototype experimental modules using a hardware and software development environment. Students should become familiar with the types of electromechanical and electronic elements such as: switches, relays, buttons, connectors, bipolar, JFET and MOSFET transistors. Students will learn various skills related to the possibilities of working with analog and digital oscilloscopes, as well as signal generators. Open source development systems are used (OLIMEXINO-328 development board). After completing the course, students should be able to determine basic modules and malfunctions of electronic products, know and use measuring devices, materials, electronic components, tools, have acquired skills to experiment with electronic devices and technological discipline when performing work with them; to have acquired habits and skills for teamwork.

DESCRIPTION OF THE COURSE: The discipline introduces students to modern electronic components and devices, to the technologies used in the field of electronics. Main attention is paid to technological processes and methods in the design and implementation of electronic devices. Manual and automated technological processes are studied. Knowledge and skills are mastered in the functional testing of the designed and realized device. The main types of electronic components and their technical-economic standardization are considered. Special attention is paid to working with measuring equipment. Open source development systems are studied.

PREREQUISITES: Semiconductors devices, Theoretical electrical engineering, Electronic circuits theory, Programming 2, Analog electronics, Digital electronics, Electromechanical systems.

TEACHING METHODS: Practical exercises in the laboratories of the department.

METHOD OF ASSESSMENT: Student reporting, demonstration and defense of self-completed assignments. There is no grade for the discipline. The practice control form is "Respected".

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:

1. Динев, П. Технологичен практикум. София, Нови знания, 2001 и 2011;

2. Динев, П., Ръсовска М., Пиндева Л., Димитров Ч., Вичева М., Ганева Н., Ръководство за лабораторни упражнения по технологичен практикум, София, Нови знания, 2004;

3. Сиджимков Д., Христов С., Ръководство за практически упражнения за специалностите "Комуникационна техника и технологии" и "Електроника", Благоевград, ЮЗУ Неофит Рилски, 2006;

4. Chowdhry B. S., Ursani A. A. and Shah M. Z. A., The First Book of Electronics Workshop: Can’t Beat A Practical Approach!, Mehran University of Engineering & Technology, Jamshoro, Pakistan, June 2014;

5. Gibilisco St., Electronics Workshop Companion for Hobbyists 1st Edition, April 27, 2015;

6. OLIMEXINO-328 an Arduino-like development board, USER’S MANUAL, Document revision E, August 2017.

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

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

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

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

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

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

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

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

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