Subject name:	Code: BpEE41	Semester: 7
Electric Drives		
Type of teaching:	Lessons per week:	Number of credits: 7
Lectures	L-3 hours ;	
Laboratory Works	LW - 2 hours.	

LECTURER:

Assoc. Prof. Ivan Kostov, Ph.D., (FEA), Control Systems Department Phone: 659 526, e-mail: <u>ijk@tu-plovdiv.bg</u> Technical University - Sofia, Branch Plovdiv

<u>**COURSE STATUS IN THE CURRICULUM**</u>: Mandatory subject for full-time students of the Electrical Engineering specialty at FEA TU-Sofia, Plovdiv Branch, Bachelor's degree.

<u>AIMS AND OBJECTIVES OF THE COURSE</u>: The training objective is to prepare students for the processes of design and operation for electric drive systems requiring knowledge of the specifics and characteristics of electric motors as objects of control.

DESCRIPTION OF THE COURSE: The Electric Drive subject introduces students to the modern general theory of electric drive. Structurally, the programme is made of electrical drive mechanics, electromechanical energy conversion, electro-mechanical and regulating properties of motors and electric drives. Students are introduced to the general physical laws of electric drives and the processes of electro-mechanical energy conversion for various types of electric motors as a major part of the electrical drive systems' structure. Based on the mathematical description of the various types of electric motors, the dynamic and static properties of the "electric engine/machine" system are determined for the various operation regimes and control methods.

<u>PREREQUISITES</u>: The subject builds upon knowledge from courses in Mathematics, Mechanics and Electrical machines.

TEACHING METHODS: Lectures, including multimedia methods, and laboratory exercises with assessed presentation of experiment protocols. These include the computer-assisted calculation and experimental determination of investigated characteristics (computerized places).

METHOD OF ASSESSMENT: Written exam during the examinations session following the seventh semester.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY:

1. Ключев В. И., Теория на електрозадвижването, "Техника", София, 1989, с. 545.

2. Костов И., Електрозадвижване, учебно пособие, ТУ-Филиал Пловдив, 2007, с.200.

3. И. Й. Костов, ЕЛЕКТРОЗАДВИЖВАНИЯ С ПОСТОЯННОТОКОВИ, АСИНХРОННИ

И СИНХРОННИ ДВИГАТЕЛИ, учебно пособие, Пловдив, 2016, ISBN 978-619-90128-0-2.

Name of the course:	Code: BpEE42	Semester: 7
Electrical Power Engineering		
Type of teaching:	Lessons per week:	Number of credits: 6
Lectures;	L - 3 hours;	
Seminars;	S - 2 hours;	
Course work.	Optional.	

LECTURER: Assoc. Prof. PhD. Stanimir Stefano, (FEA), tel: +35932659512, e-mail: <u>glasst@abv.bg</u>, Technical University - branch Plovdiv.

<u>SEMINARS</u>: As. PhD. Vasil Drambalov, (FEA), tel: +35932659638, e-mail: <u>vdrambalov@abv.bg</u>, Technical University - branch Plovdiv.

<u>COURSE STATUS IN THE CURRICULUM</u>: Compulsory subject for the major Electrical Engineering of the Faculty of Electrical Engineering and Automation, Bachelor of science.

<u>AIMS AND OBJECTIVES OF THE COURSE</u>. The purpose of the course is to provide students with knowledge in the field of electrical power engineering that will help them easily master further subjects.

DESCRIPTION OF THE COURSE: Structure of the electric power system – power and electric power output, electric plants, quality of the electric power; Electrical equipments in electrical grids – open-air and cable electric transmission network, power generators and transformers, substitute schemes and parameters, working regimens on star centers of electrical grids; Currents of the a short circuit – three-phase short circuit, over transitional, transitional and stability currents of a short circuit, asymmetric short circuit, methods for calculation of short circuit; Adjustment of voltage in electrical grids – fall and waste of the voltage, schemes and means for adjustment; Electrotechnical and mechanical estimate of electric transmission network – assessment of section conductor, isolation and isolation distance, ecology influence; Relay's defence and anti-failure automation – mode devices, current's and pointed out's modes, earth's and voltage's modes, mode defenses of electric transmission networks and transformers; Stability on electrical systems.

PREREOUISITES: The course is conducted on the basis of knowledge from the courses: FpBEE02, FpBEE09, FpBEE10, FpBEE18, BpEE24, BpEE26, BpEE28, BpEE30, BpEE31, BpEE32, BpEE36 and BpEE37.

<u>TEACHING METHODS</u>: Lectures. Seminars - students solve problems of Electrical power. Course work whit a description and defend.

<u>METHOD OF ASSESSMENT</u>: Written exam at the end of the 5^{th} semester (70%), course work (20%) and participation in lectures (10%).

INSTRUKTION LANGUAGE: Bulgarian.

- 1. Генов Л. Електроенергетика, София, ДИ "Техника", 1985;
- 2. Нотов П., С. Неделчева, Електроенергетика I, II, III и IV част, София, 2009, 2017;
- Нотов П., Преходни процеси в електроенергийните системи, София, ДИ "Техника", 1985;
- 4. Влъчков П., Електрически мрежи и системи, София, ДИ "Техника", 1989;
- 5. Николов Д., Електрически мрежи и системи, София, ДИ "Техника", 1994;
- 6. Кирчев В., К. Янев и М. Георгиев, Електрически мрежи средно и високо напрежение, Летера, 2006;
- 7. Кирчев В, С. Стефанов, Ръководство за курсова задача по Електроенергетика, Пловдив, Принтекс. 2013.

Name of the course:	Code: BpEE43	Semester: 7
Switching techniques		
Type of teaching:	Lessons per week:	Number of credits: 6
Lectures, laboratory work, course	L-3 hours, $LW-2$ hours,	
assignment and self-study	Self-study -5 hours.	

LECTURERS: Assoc. Prof. Dian Malamov, Ph.D., Faculty of Electronics and Automation (FEA), Department of Electrical Engineering, e-mail: <u>deanmalamov@abv.bg</u>, Phone: (032) 659687; **Principal** Assistant Ivan Hadzhiev, Ph.D., Faculty of Electronics and Automation, Department of Electrical Engineering, Phone: (032) 659686, e-mail: <u>hadzhiev_tu@abv.bg</u>; Technical University of Sofia, Plovdiv Branch.

<u>COURSE STATUS IN THE CURRICULUM</u>: Compulsory course for full-time students, majoring in "Electrical Engineering" at the Faculty of Electronics and Automation, TU-Sofia, Plovdiv Branch, for receiving the Bachelor of Science degree.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to allow the students to acquire knowledge, related to the equipment, facilities, methods and means of switching and protecting during the process of using electrical energy in high and low voltage circuits.

DESCRIPTION OT THE COURSE: The following issues are considered: basic concepts, variables, characteristics, requirements toward switching equipment, modes of switching, switching of components in main circuits, choice of devices depending on the application, on the switching frequency and wear-resistance, various types of protecting equipment, basic use of switching devices in main circuits, electronic compatibility (interface) between switching devices and electronic equipment, constructive components and design of switching devices and complex switching equipment, basic electric circuits for implementation, for testing, mounting, exploitation and repair of switching devices.

<u>PREREQUISITES</u>: The course is based on students' knowledge of: Theoretical electrical engineering, Electrical measurements, Electro-technical materials, High voltage techniques, Electrical apparatus and Electrical machines.

TEACHING METHODS: Lectures, prepared for multimedia presentation and laboratory exercises, during which experiments, related to the topics of the lectures are conducted.

METHOD OF ASSESSMENT: Written examination at the end of the semester (75%), laboratory work (25%), course assignment ending with a separate grade (after development and defense in front of the supervising lecturer).

LANGUAGE OF INSTRUCTION: Bulgarian.

BIBLIOGRAPHY:

1. Alexandrov A., Electrical apparatus, Sofia, 2004 (Bulgarian).

2. Pisarev A., A. Lichev, Design of switchgear for low voltage, Sofia, Technics 1987 (Bulgarian).

3. Switchng Protection and Distribution in Low-Voltage Networks, SIEMENS, Berlin 1994, ISBN 3-89578-000-6.

4. Robert T. Smeaton, Wiliam H. Ubert, Switchgear and Control Handbook, Third Edition, McGraw-Hill Company, 1998 ISBN 0-07-058451-6.

5. Frank W.Kissy, Jack L. Waren, Design Fundamentals fo Low-Voltage Distribution and Control MARCEL DEKKER INS, 1987, ISBN 0-8247-7515-5.

6. Circuit Inerruption Theory and Techniques, en Thomas E. Browne, Jr. MARSEL DEKKER INC.1984, ISBN 0-8247-7177-X.

7. Electrical Instsllation Handbook: Protection and Control Devices, ABB, Vol. 1, 5th edition.

Name of the course: Electrotechnic and electronic technologies	Code: BpEE44	Semester: 7
Type of teaching:	Lessons per week:	Credits: 6
Lectures;	L-3 hours;	
Laboratory works.	LW - 2 hours.	

LECTURER Assoc. Prof. Ph.D. Stanimir Stefanov, Technical University – Sofia, branch Plovdiv, Faculty of Electrical Engineering and Automation; Address: 25 Tsanko Dyustabanov Str., Tel: (032) 659512, e-mail: <u>glasst@abv.bg</u>

Assoc. Prof. Ph.D. Dian Malamov, Technical University – Sofia, branch Plovdiv, Faculty of Electrical Engineering and Automation; Address: 25 Tsanko Dyustabanov Str., Tel: (032) 659 687 e-mail: <u>deanmalamov@abv.bg</u>;

<u>COURSE STATUS IN THE CURRICULUM:</u> Compulsory subject for full-time students in the major of "Electrical Engineering" from the Faculty of Electrical Engineering and Automation, TU Sofia, Branch Plovdiv, for receiving the Bachelor of science degree.

<u>AIMS AND OBJECTIVES OF THE COURSE:</u> The aim of the course is to allow the students to obtain knowledge for specific technologies: from conventional technologies of physical chemistry material treatment to modern treatment technologies and manufacture, details and constructive elements, single and multiple manufacture as well.

DESCRIPTION OT THE COURSE: Main topics: Technological process – definition and features; Specific technologies and equipments for form creation in electrotechnic and electronic manufactures; Specific technologies for changing inner and surface structure of materials; technologies for details and node production in electrotechnic and electronic industry; Technologies for products of EEP; Assembling technologies; Estimation of the technological processes qualities; Quality assessment of technological processes;

PREREQUISITES: The course is conducted on the basis of knowledge from the courses: FpBEE02, FpBEE09, FpBEE10, FpBEE18, FpBEE20, BpEE24, BpEE28, BpEE30, BpEE31, BpEE36 and BpEE37.

TEACHING METHODS: The lectures are conducted with help of slides. The laboratory works clearly present lecture topics, expand knowledge and give practical experience about basic technological processes and equipments.

METHOD OF ASSESSMENT: Written exam at the end semester (70%), Laboratory works (20%), Participation in lecture: 10 %.

ISTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY:

1. 1. Даскалов В., Технология на електрическите машини и апарати, С., ИПК на ТУ, 1997.

2. Масларов И, Й. Шопов, Технологии в електротехниката и електрониката, С., Авангард Прима, 2005.

3. Филипов, Ф., Конструкция и технология на полупроводникови прибори, Техника, С., 1987.

4. Даскалов, В., Ръководство за лабораторни упражнения по технология на електрическите машини и апарати, София, 1997.

5. Георгиев Н., Ръководство за лабораторни упражнения по технологии в електрониката, С., 1997.

6. К. Хинов, Ръководство за курсова работа по производствени технологии, С., 2004.

Name of the course: Ecology and renewable energy	Code: BpEE45	Semester: 7
Type of teaching: Lectures and laboratory work	Classes per week: L - 2 hours; $LW - 2$ hours	Number of the credits: 6

LECTURER:

Assoc. Prof., PhD. . Stanimir Stefanov, e-mail: glasst@abv.bg, тел: 032 659 512; Asst. Prof. Dr. Ilko Tarpov, e-mail: stsb_plovdiv@abv.bg, TU-Sofia, Branch Plovdiv, Faculty of Electronics and Automation, Department of Electrical Engineering.

COURSE STATUS IN THE CURRICULUM

Compulsory course for full – time and part – time students from specialties of "Electrical Engineering" of Technical University – Sofia, in "bachelor's" degree.

AIMS AND OBJECTIVES OF THE COURSE

The course aims to introduce students to the possibilities of using renewable energy to produce electricity. The course will also deal with installations using still less popular sources of energy - wind power ocean, geothermal.

DESCRIPTION OF THE COURSE

The course deals with environmental issues and technical possibilities for Exploitation of renewable energy sources.

PREREQUISITES

Substantial knowledge of Chemistry, Physics, Electrical engineering and Measurement techniques is needed.

THEACHING METHODS

Lectures. Laboratory work performed under laboratory manual reports, prepared by the students and protected classes to the teacher.

METHODS OF ASSESSMENT

Continuous assessment at the end of the seventh semester. The current assessment is conducted according to a schedule agreed with the students and approved by the Training Department of the Technical University of Sofia, Branch Plovdiv.

teaching speech: Bulgarian

ADVISABLE BIBLIOGRAPHY

 Кирчев В., М. Генчев, "ВЪЗОБНОВЯЕМИ ЕНЕРГИЙНИ ИЗТОЧНИЦИ", учебник, ISBN 978-954-2937-01-2, Дъга принт ООД, Пловдив, 2012
Макавеев Хр. и колектив "ПРОБЛЕМИ НА ИНЖЕНЕРНАТА ЕКОЛОГИЯ", учебник, издателство ВМЕИ-Филиал Пловдив,1994
Киров Д., "ИНЖЕНЕРНА ЕКОЛОГИЯ", Техника, София, 2011

COURSE DESCRIPTION		
Name of the course:	Code: BpEE 46.1	Semester: VIII
Marketing		
Type of teaching:	Lessons per week:	Number of credits: 4
Lectures, laboratory exercises	L-2, LE-2	

LECTURERS: Assistant Professor Elena Zlatanova, Ph.D.; e-mail: elyzlatanova@abv.bg

<u>COURSE STATUS IN THE CURRICULUM:</u> An optional course for the students, majoring in "Electrical Engineering", Bachelor degree course.

<u>AIMS AND OBJECTIVES OF THE COURSE:</u> To give the students knowledge of the theoretical, organizational, managerial methodological and practical aspects in planning and conducting marketing activities.

<u>**COURSE DESCRIPTION**</u>: Main topics: Marketing basics; Marketing environment; Marketing concepts; Marketing research; Product and product policy; Prices and pricing policy; Segmentation and market positioning; Distribution and logistics; Internet marketing; Advertising; Public relations.

PREREQUISITES: Basic knowledge of economics, sociology, basics of management is required.

<u>**TEACHING METHODS:**</u> Lectures and seminar exercises, aided by audio, video and multimedia technique. Active methods of teaching, involving the students, are used.

METHODS OF ASSESSMENT: Examination (written).

LANGUAGE OF INSTRUCTION: Bulgarian

- 1. Благоев Веселин, Маркетинг, С, InterndtionalUniversity, София 2003
- 2. Бърд Дрейтън, Директен маркетинг, Б, 1993
- 3. Волф Ябок, Маркетинг, С, 1995
- 4. Джефкинс Ф., Въведение в маркетинга, рекл. И Пр, С, 1993
- 5. Доганов Димитър, Рекламата каквато е, Princeps, София, 2000
- 6. Желев Симеон, Маркетингови изследвания, Тракия-М,София, 2002
- 7. Карас Честър, Търговските преговори...,ВТ, 1993
- 8. Кафтанджиев Христо, Хармония в рекламната комуникация, Ciela, София, 2008
- 9. Котлър Филип, Маркетинг 3.0, София, 2010
- 10. Кошник Волфганг, Световен речник по маркетинг и реклама, Б, 1997.
- 11. Льодюк Робер, Мениджмънт на рекламата, С, 1992
- 12. Маринова Елена, Маркетинг, продукт, реклама, В, 1992
- 13. Маринова Елена, Маркетингов план, В,1996
- 14. Оксли Харолд, Принципи на пъблик рилейшънс, Б, Делфин прес, 1993
- 15. Прайд У., Маркетинг концепции и стратегии, С, 1994
- 16. Риивс Росър, Реализмът в рекламата, В, 1995
- 17. Стойков Любомир, Фирмена култура и комуникация, УНСС, С, 1995
- 18. Фентън Джон, Как се продава срещу конкуренцията, С, 1992

Name of the course: Marketing	Code: BpEE 46.2	Semester: VIII
Type of teaching: Lectures, laboratory exercises	Lessons per week: L - 2, $LE - 2$	Number of credits: 4

LECTURERS: Associate Professor Vladimir Ivanov, PhD, tel.: 032 659-715; vivanov@abv.bg

Chief assistant prof. Desislava Shatarova, PhD, tel.659 716; e-mail: <u>desislava@tu-plovdiv.bg</u>. Sofia Technical University – Branch Plovdiv

<u>COURSE STATUS IN THE CURRICULUM:</u> An optional course for the students, majoring in "Electrical Engineering", Bachelor degree course.

<u>AIMS AND OBJECTIVES OF THE COURSE:</u> students are learning about the possibilities of creating and successfully managing a business in the form of a small company as successful entrepreneurs.

<u>**COURSE DESCRIPTION</u>**: Main topics: The meaning of a Small Business - Problems and Trends; Small business start-up strategies; Legal forms of doing small business; Financing of business; How to Write a Business Plan; Marketing; Human resources management and leaving the business.</u>

PREREQUISITES: Basic knows ledges in Mathematics and Economics of the enterprise.

TEACHING METHODS: Lectures and seminars supporteds by audio, video and multimedia equipment. Active teaching methods, constantly engaging the students, are used. **METHODS OF ASSESSMENT:** The level of achieving the goal of the course is monitored by ongoing assessment, expressed in a grade, formed by two components: a control tests with a weight of 0.50 and Business plan performance during the seminars by a factor of 0.50.

LANGUAGE OF INSTRUCTION: Bulgarian

- 1. Иванов Владимир, Иванов Румен Управление на малка фирма учебно помагало, Център по предприемачество към ТУ-София, филиал Пловдив
- 2. Иванов Владимир Ръководство за подготвяне на бизнес план
- 3. David Stokes Small Business Management DP Publications Ltd 1995
- 4. Маринов, Г. и др. Приложна икономика ИНФОРМА ИНТЕЛЕКТ, С. 1997
- 5. Нанде, Арвин Започнете вашия бизнес, наръчник ПРООН, С., 1998
- 6. Въведение в бизнеса Джанет Кук ФЮТ, 1994
- 7. Старт в бизнеса BARCLAYSBANKPLC, Изд. Къща stn В. Търново 1992
- 8. Азбука на успешния бизнес МОТ Женева, Изд. ВШИОМ "ОКОМ", С., 1993
- 9. Тодоров, К. Стратегическо управление в малките и средните фирми Изд. "НЕКСТ", С., 1997
- 10. Тодоров, К и др. 25 казуса за предприемачи и мениджъри от практиката,
- 11. Тодоров, К и др. 9 бизнес плана за стартиране на собствен бизнес в условията на валутен съвет, Изд. "НЕКСТ", С., 1998
- 12. Кавазаки, Гай Как да побъркате конкурентите си Princeps, С., 1998
- 13. Фентън, Джон Как се продава срещу конкуренцията АПИС, С., 1992

Name of the course:	Code: BpEE47.1	Semester: 8
Automatics		
Type of teaching:	Lessons per week:	Number of credits: 4
Lectures and	L – 2	
laboratory work	LW – 2	

Lecturer: Assoc. Prof. PhD. Sevil Ahmed, Technical University Sofia, Branch Plovdiv, Faculty of Electronics and Automatics (FEA), Control Systems Department, Phone: 032 659585, Email: <u>sevil.ahmed@tu-plovdiv.bg</u>.

<u>COURSE STATUS IN THE CURRICULUM</u>: Elective for the student's specialty "Electrical Engineering" BEng programme of the Faculty of Electronics and Automatics

<u>AIMS AND OBJECTIVES OF THE COURSE:</u> The aim of the course is to give the students essential knowledge and skills in Automatics, including some problems of the analysis and synthesis of automatic control systems.

DESCRIPTION OF THE COURSE: The course considers linear automatic control systems – basic definitions, principles of automatic control, control lows, classification of control systems; Mathematical models of control systems – differential equations, linearization, transfer function, block diagram models and transformations; Forced response of basic dynamic units – time and frequency response; Stability of linear systems – definitions, necessary and sufficient conditions, Routh-Hurwitz criterion, Nyquist criterion, Bode criterion; Performance of feedback control systems – time domain performance specifications, steady-state error, performance indices etc.; Linear control system design – Bode frequency-domain method to design compensators. State space description of linear systems. Lyapunov equation. Design by pole assignment; Industrial regulators.

PREREQUISITES: Higher Mathematics I, II, III part, Physics I, II part, Theoretical electrotechnics I, II part, Technical Mechanics, Programming and computer systems 1, 2 part, English language.

<u>**TEACHING METHODS</u>**: Lectures using multimedia; laboratory work using analogue modeling devices and measurement technics, computer-aided design, analysis and simulation, work in teams, protocols.</u>

METHOD OF ASSESSMENT: One two-hour assessment work in the end of the semester (90%). Performance from laboratory works is also considered (10%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:

1. Ishtev, K., Automatic Control Theory. Sofia, 2000 (in Bulgarian);

2. Naplatanov, N. et al., Introduction in Control Theory, Sofia, 1987 (in Bulgarian);

3. Naplatanov, N., *Bases of Technical Cybernetics*, Vol. 1: Automatic Control Theory. Sofia, Technics, 1976 (in Bulgarian);

- 4. Voronov, A. A., Automatic Control Theory, vol. 1, Moscow, 1986 (in russian);
- 5. Zaitzev, G. Theory of Automatic Control and Regulation. Kiev, 1988 (in russian);
- 6. Chen, C-T., Analog & Digital Control System Design, Oxford University Press, 1993;
- 7. Dorf, R. C., Modern Control Systems. Addison-Wesley Publishing Company, 1989;
- 8. Nise, N. S., Control Systems Engineering, The Benjamin/Cummings Publishing Company, Inc., 1992
- 9. Saadat, H., Computational Aids in Control Systems Using MATLAB, McGraw-Hill, 1993

Name of the course:	Cod: BpEE48.1	Semester: 8
Electrical Networks and Systems.		
Type of teaching:	Lessons per week:	Credits: 3
Lectures;	L - 3 hours;	
Laboratory work;	LW - 2 hours;	
Course Project.	Optional.	

LECTURER: Assoc. Prof. PhD. Stanimir Stefanov (FEA), tel: +35932659583, e-mail: <u>glasst@abv.bg</u>, Technical University - branch Plovdiv.

<u>COURSE STATUS IN THE CURRICULUM</u>: Eligible subject for the major Electrical Engineering of the Faculty of Electrical Engineering and Automation, Bachelor of Science.

<u>AIMS AND OBJECTIVES OF THE COURSE:</u> The subject aims at introducing students to new theoretical knowledge and practical skills in field of schemes and methods for electrical and mechanical determination of electrical networks.

DESCRIPTION OF THE COURSE: Open – air networks; Cables; Substitutes schemes and parameters of distribution line; Schemes of open networks low and high voltage; Network whit isolated star center; Exchange networks; Grounded through actively resistances grids; Grids whit effective grounded star center; Losses of power; Working parameters of open grids; Methods for analyses of established regime of closed grids; Choice of conducts – on heating, on permissible lose of voltage, on minimal outgo of metal; Mechanical measure of open - air distribution line - retable climatic circumstance, mechanical loads on conduct and safer lightning line, determination place at post on the trace of open air electrical lines; Transformer posts in residential areas.

PREREQUISITES: The course of lectures is based on knowledge of FpBEE02, FpBEE09, FpBEE10, FpBEE18, BpEE24, BpEE26, BpEE28, BpEE30, BpEE31, BpEE32, BpEE36, BpEE37 and BpEE42.

TEACHING METHODS: Lectures. Labs are conducted in accordance whit the lab books and reports prepared by the students and checked by the supervisor.

METHOD OF ASSESSMENT: Written test during in the 5th and 10th weeks of the 8th semester (70%), laboratories (10%), individual course project (20%). Individual course project 10th weeks with assessment.

INSTRUKTION LANGUAGE: Bulgarian.

- 1. Кирчев В., К. Янев и М. Георгиев, Електрически мрежи средно и високо напрежение, Летера, 2006
- 2. Кирчев В, С. Стефанов, Ръководство за курсова задача по Електроенергетика, Пловдив, Принтекс. 2013.
- 3. Неделчева С., Електрически мрежи. Технически университет София, 2005.
- 4. Нотов П., С. Неделчева, Електроенергетика I и IV част, София, 2009, 2017;
- 5. Николов Д., Електрически мрежи и системи, София, Техника, 1994.
- 6. Генов Л., Електроенергетика, София.: Техника, 1985.
- 7. Влъчков П Електрически мрежи и системи, ч.1 София,. Техника, 1989.
- 8. Влъчков П Електрически мрежи и системи, ч.2 София,. Техника, 1990.
- 9. Влъчков П., Н. Генков. Електрически мрежи София : Техника, 1987.
- 10. Генков, Н., К. Янев, В. Захариев, Д. Николов, М. Боцов. Ръководство за проектирана на електрически; мрежи. София, Техника, 1993.
- 11. Андреев Х. Електрически мрежи и системи ръководство за курсово проектиране, Русе, РУ "Ангел Кънчев", 2000.

Name of the course:	Code: pBEE49.1	Semester: 8
CAD systems in Electrical Engineering		
Type of teaching:	Lessons per week:	Credits: 3
Lectures and Laboratory Work.	L - 2 hours, $LW - 2$ hours, Self	
	Study - 8 hours	

LECTURER:

Assoc. Prof. Vasil Spasov, Ph.D., Faculty of Electronics and Automation, Phone: (032) 659535, email: **vasilspasov@yahoo.com**, TU-Sofia, Branch Plovdiv, Department of Electrical Engineering.

<u>COURSE STATUS IN THE CURRICULUM</u>: Optional course for the undergraduate students specialty Electrical Engineering at the Faculty of Electronics and Automatics studying B.Eng. Programme.

<u>AIMS AND OBJECTIVES OF THE COURSE</u>: The aim of the course is to acquaint the students with the modern CAD of electrical devices and to provide the students with a basic knowledge for using the CAD systems.

DESCRIPTION OF THE COURSE: Main topics: Automated design and CAD system. Principles of the system approach to design. Structured, block-hierarchical, object-oriented approach and their peculiarities. Structure and components of CAD systems - technical, mathematical, program, information, linguistic, methodological and organizational provision. CAD systems based on Windows. CAD system architecture based on the Finite Element Method. Galerkin Formulation for the two-dimensional Finite Element Method. Analysis of the electromagnetic field of an induction motor. Introduction to the Finite Element Method Magnetics CAD system.

<u>PREREQUISITES</u>: Mathematics, Physics, Theoretical Electrical Engineering, Electrical Machines and Electrical Apparatuses.

TEACHING METHODS: Lectures and Laboratory exercises. The lectures are delivered by multimedia. The exercises are provided with a manual and are conducted in a computer room. The students prepare an individual report for each exercise and defend it before the supervising lecturer.

METHOD OF ASSESSMENT: Laboratory exercises (40%) and testing during the semester (60%).

INSTRUCTION LANGUAGE: Bulgarian

<u>BIBLIOGRAPHY</u>: 1. Александров А., Компютърно проектиране на електрически апарати, София, Авангард Прима, 2004. 2. Брандиски К., И. Ячева, САD системи в електромагнетизма, София, Сиела, 2002. 3. Кулон Ж. Л., Ж. Сабоннадьер, САПР в электротехнике, Москва, Мир, 1988. 4. Salon S., Finite element analysis of electrical machines, Kluwer Academic Publishers, 1998. 5. Duggal V., CADD Primer, MailMax Publishing, New York, 2000. 6. Meeker D., Finite Element Method Magnetics v. 4.01 User's manual, 2006. Ячев И., И. Маринова. Числени методи и моделиране на вериги и полета - I част. Технически университет - София, 2011.

Course title: Electronic	Code: BpEE50	Semester: 8
instrumentation and primary		
sensors and transducers		
Type of teaching:	Hours per week:	number of credits: 3
Lectures	L - 2 hours;	
laboratory exercises	LE - 2 hours.	

LECTURER: Associate Professor, PhD **Vania Iordanova Rangelova** Department "Electrical engineering", tel. 032 659 685, cab. 3325, email: <u>vaniarangelova@tu-plovdiv.bg</u>, Technical University of Sofia, Branch Plovdiv

<u>COURSE STATUS IN THE CURRICULUM</u>: The course is selectable for the students of specialty "*Electrical engineering* " on FEA TU-Sofia, Plovdiv Branch for the academic degree "Bachelor."

PURPOSE OF THE COURSE: The course aim is to provide students with the knowledge and skills to work with electronic analog and electronic digital systems and measuring instruments, including modern ones, as well as with the principles of operation of various types of primary transducers of non-electrical quantities into electrical ones, such as for example - inductive, resistive, photoelectric, thermoelectric, etc.

<u>COURSE DESCRIPTION</u>: The discipline covers a very wide range and includes studying the principles of creating measurement generators, frequency synthesizers, the use of digital oscilloscopes, learning the principles of implementing modern measurement methods - virtual measurement systems, learning the principles of creating and using different types of primary transducers of non-electrical quantities to electrical ones, such as inductive, resistive, thermoelectric, etc. for measurement of moving, illuminosity, temperature etc.

<u>BACKGROUND</u>: Previous knowledge in Physics, Mathematics, Theoretical Electrical Engineering, Materials Science, Semiconductor components, Computer systems.

TEACHING METHODS: Lectures, laboratory reports with a written report and individual protection.

<u>METHODS OF ASSESSMENT</u>: Written ongoing assessment at the end of semester (80%), laboratories assignments (20%).

LANGUAGE: Bulgarian

RECOMMENDED BOOKS

1. Vania Rangelova, Lecture Notes on Electronic Measuring Instruments and Primary Transdicers, 2019r, ISBN 978-619-91263-6-3

2. Vania Rangelova and Nikolai Paunkov, Manual on Electronic Measuring Instruments and Primary Transdicers, - under print

3. Stanchev I. Electronic Analog Meters. Technics Sofia, 1981

4. Electronics for all- http://emkelektron.webnode.com/

5. Basic Theory of synthesizers, S. Krastev

http://ktt-learning.hit.bg/files/tema_01_8.pdf

6. Troynov B., Instruments for measuring physical-mechanical quantities, TU- Sofia, 1990r.

Name of the course	Code: BpEE51.1	Semester: 8
Electromagnetic compatibility		
Type of teaching:	Lessons per week:	Number of credits: 3
Lectures (L)	L $-2;$	
Laboratory work (LW)	LW - 2;	
Course project (CP)	CP - 1	

LECTURER:

Prof. Ph.D. Georgi Ganev, tel.: 032 659 560,

Department of Electrical Engineering, email: <u>gganev@tu-plovdiv.bg</u> Technical University of Sofia, Plovdiv branch

<u>**COURSE STATUS IN THE CURRICULUM</u>**: Elective course for students specialty Electrical Engineering Bachelor Engineering program of the Faculty of Electronics and Automation.</u>

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to be able to know the electromagnetic compatibility problems of power electrical devices and equipment applied in power systems and in different industries, the causes give rises to, methods and tools of their overcoming.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction to electromagnetic compatibility and main standards; Power quality, the causes power quality aggravate; methods and tools for electromagnetic disturbances susceptibility reduction; methods and tools for power quality improvement in individual consumers or distribution networks.

PREREQUISITES: Mathematics, Theory of Electrical Engineering, Electrical Measurements, Electrical Machines, Electrical Apparatuses, Power Electronics, Power Systems.

<u>TEACHING METHODS</u>: Lectures using multimedia presentations. Laboratory works in teams (3-4 students each). The students make project solving technical problem concerning power quality improvement.

METHOD OF ASSESSMENT: Written tests in the middle and at the end of semester. The final mark is the aggregate of the written test (60%), the laboratory work (10%) and course project (30%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:

1/ Аррилага Дж., Д.Брэдли, П.Боджер, Гармоники в электрических системах, Энергоатомиздат, Москва, 1990; 2/ Динов В., Несиметрични режими и преходни процеси на електрическите машини, Техника, София, 1974; 3/ Baggini A., Handbook of Power Quality, J.Wiley, 2008; 4/ Bollen M., Understanding power quality problems, 2000; 5/ Dugan R., M.McGranaghan, S.Santoso, H.Beaty, Electrical Power System Quality, 2004; 6/ Grigsby L.L., Power Systems, CRC Press, 2006; 7/ Kusko A., M.Thompson, Power Quality in Electrical Systems, 2007; 8/ Sankaran C., Power quality, 2002; 9/ Schlabbach J., D.Blume, Voltage Quality in Electrical Power Systems, IET Power and Energy Series no.36, 2001; 10/ Shenkman A.L., Transient Analysis of Electric Power Circuits Handbook, Springer, 2005; 11/ Van der Sluis L., Transients in Power Systems, J.Wiley, 2001; 12/ Watson N., J.Arrillaga, Power Systems Electromagnetic Transients Simulation, IET Power and Energy Series, vol.39, 2003.