Recomended pass through the study plan

Name of the pass: Open Electronic Systems - Passage through study

Faculty/Institute/Others:
Department:
Pass through the study plan: Open Electronic Systems
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Welcome page
Type of study: unknown full-time
Note on the pass:

Coding of roles of courses and groups of courses:
P - compulsory courses of the program, PO - compulsory courses of the branch, Z - compulsory courses, S - compulsory elective courses, PV - compulsory elective courses, F - elective specialized courses, V - elective courses, T - physical training courses

Coding of ways of completion of courses (KZ/Z/ZK) and coding of semesters (Z/L):
KZ - graded assesment, Z - assesment, ZK - examination, L - summer semester, Z - winter semester

Number of semester: 1

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
AE8B14ADP	**Algorithm Development and Programming**	Z,ZK	5	2+2c	Z	P
BEEZZ	**Basic health and occupational safety regulations** *Radek Havlíček, Vladimír Kůla, Ivana Nová **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P
AE8B01DMG	**Discrete Math. & Graphs**	Z,ZK	5	3+1s	1	P
AE8B01LAG	**Linear Algebra**	Z,ZK	7	4+2s	1	P
AE8B01MC1	**Mathematics-Calculus1**	Z,ZK	7	4+2s	1	P
BEEZB	**Safety in Electrical Engineering for a bachelor´s degree** *Radek Havlíček, Vladimír Kůla, Ivana Nová **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z,L	P
AE8B01CAS	**Comp.Alg.Syst.**	Z	2	0+2c	1	PO
AE8B32IES	**Introduction to Electronic Systems**	Z	2	0P + 2L	Z	PO

Number of semester: 2

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
AE8B01DEN	**Differential Equations&Numerical Methods**	Z,ZK	7	4+2s	1	P
AE8B01MCM	**Mathematics-Calculus m-D**	Z,ZK	7	4+2s	1	P
AE8B02PH1	**Physics 1**	Z,ZK	7	4+2L	L	P
AE8B37DIT	**Digital Design**	Z,ZK	5	2P+2C	L	PO
AE8B31ELE	**Elements of Electronics**	KZ	4	2P	L	PO

Number of semester: 3

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
AE8B01MCT	**Mathematics-Complex Variable and Integral Transforms**	Z,ZK	7	4+2s	1	P
AE8B02PH2	**Physics 2**	Z,ZK	7	4+2L	Z	P
AE8B01PSI	**Probability,Statistics and Information Theory**	Z,ZK	6	4+2s	1	P
AE8B17EMT	**Electromagnetic Field Theory**	Z,ZK	8	4P+2S	Z	PO

Number of semester: 4

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
AE8B01AMA	**Advanced Matrix Analysis**	Z,ZK	4	3+1s	1	P
AE8B01OGT	**Optimization and Game Theory**	Z,ZK	4	3+1s	L	P
AE8B31CIR	**Circuit Theory**	Z,ZK	8	4P+2S	L	PO
AE8B37SAS	**Signals and Systems**	Z,ZK	8	4P+2C	L	PO
AE8B34SST	**Solid State Physics**	Z,ZK	4	3P+1L	L	PO

Number of semester: 5

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
AE8B31AAC	**Analog and Acitve Circuits**	Z,ZK	6	3P+2S	Z	PO
AE8B32DNT	**Data Networks Theory**	Z,ZK	5	3P + 1L	Z	PO
AE8B37DCM	**Digital Communications**	Z,ZK	5	4P+0C	Z	PO
AE8B32DSP	**Digital Signal Processing**	Z,ZK	5	3P + 1L	Z	PO
AE8B32DCL	**Digital Signal Processing and Communication Laboratory**	Z	2	0P + 2C	Z	PO
AE8B34EOD	**Electronic and Optoelectronic Devices**	Z,ZK	6	3P+2L	Z	PO

Number of semester: 6

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
ABAP9	**Bachelor thesis**	Z	9	28s	L	P
AE8B17ELD	**Electrodynamics**	Z,ZK	5	3P+1S	L	PO
AE8B38EME	**Electronic Measurements**	KZ	4	2P+1L	L	PO
AE8B35FCS	**Feed-Back Control Systems**	Z,ZK	6	4P+2L	L	PO
AE8B37SSP	**Statistical Signal Processing**	Z,ZK	6	4P+0C	L	PO

List of groups of courses of this pass with the complete content of members of individual groups

List of courses of this pass:

Code	Name of the course	Completion	Credits
ABAP9	Bachelor thesis	Z	9
AE8B01AMA	Advanced Matrix Analysis	Z,ZK	4
The course covers advanced topics of linear algebra, in particular matrix factorizations and construction of matrix functions.			
AE8B01CAS	Comp.Alg.Syst.	Z	2
Computer algebra systems (CAS) Maple, Matlab and Mathematica are used to demonstrate basic mathematical concepts that students encounter in subjects Mathematics and Introductory Algebra. Seminars provide both computational and graphical examples with particular emphasis on problems whose solution without CAS is either difficult or impossible.			
AE8B01DEN	Differential Equations&Numerical Methods	Z,ZK	7
This course offers an introduction to differential equations and numerical methods. We survey major types of ordinary differential equations and introduces partial differential equations. For common problems (roots, systems of linear equations, ODE?s) we will show basic approaches for solving them numerically.			
AE8B01DMG	Discrete Math. & Graphs	Z,ZK	5
The course introduces basic notions from discrete mathematics directed to those topics useful for electrical engineering studies. The content of the course covers: infinite sets with emphasis to cardianlity of sets, binary relations with emphasis to equivalence relations and partial ordes'; integers, relation modulo n'; basic algebraic structures (includin finite fields of characteristic 2). Furher the course contains basic notions and their applications from graph theory.			

AE8B01LAG	Linear Algebra	Z,ZK	7
This course covers introductory topics of linear algebra. The main focus is on the related notions of linear spaces and linear transformations (linear independence, bases and coordinates) and matrices (determinants, inverse matrix, matrix of a linear mapping, eigenvalues). Applications include solving systems of linear equations, geometry in n-space (including dot product and cross product).			
AE8B01MC1	Mathematics-Calculus1	Z,ZK	7
The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.			
AE8B01MCM	Mathematics-Calculus m-D	Z,ZK	7
The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals. Other part contains function series and power series with application to Taylor and Fourier series.			
AE8B01MCT	Mathematics-Complex Variable and Integral Transforms	Z,ZK	7
AE8B01OGT	Optimization and Game Theory	Z,ZK	4
AE8B01PSI	Probability,Statistics and Information Theory	Z,ZK	6
Basics of probability theory, mathematical statistics, information theory, and coding. Includes descriptions of probability, random variables and their distributions, characteristics and operations with random variables. Basics of mathematical statistics: Point and interval estimates, methods of parameters estimation and hypotheses testing, least squares method. Basic notions and results of the theory of Markov chains. Shannon entropy, mutual and conditional information.			
AE8B02PH1	Physics 1	Z,ZK	7
The basic course of physics at the Faculty of Electrical Engineering - Physics 1, is devoted to the introduction into two important areas of physics. The first one is a classical mechanics and the second one is the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematics; dynamics of the mass particle, system of mass particles and rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, which they can meet during their further studies. The classical mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary. The students can use the facts gained in this course in the study of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in this course is required for the study of the consecutive course Physics 2.			
AE8B02PH2	Physics 2	Z,ZK	7
The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of phenomenological and statistical thermodynamics. Following topic - the theory of waves - will give to the students basic insight into the properties of waves and will help to the students to understand that the presented description of the waves has a universal character in spite of the waves character. Particular types of waves, such as acoustic or electromagnetic waves are the subjects of the following section. Quantum mechanics physics will complete the student´s general education in physics. The knowledge gained in this course will help to the students in study of modern technical areas encountered during their studies and will allow them to understand the principles of novel technologies and functioning of new electronic devices.			
AE8B14ADP	Algorithm Development and Programming	Z,ZK	5
Course objective: Introduction to algorithm design of basic and more advanced computer tasks, Digital computer structure, Introduction to the C programming language, Syntax and semantics. Basic skills of procedural programming paradigm, variable, data type, declaration, operators, expressions, statements, functions, parameter passing, arrays, pointers, structures, compilation and debugging methods, preprocessor, conditional compilation, standard libraries, specific of embedded computer systems programming and debugging.			
AE8B17ELD	Electrodynamics	Z,ZK	5
The course AEB17ELD (electrodynamics) is a follow up of the course AEB17EMTA (Electromagnetic field theory). The course starts with a decomposition of electromagnetic field into planewaves, introduces radiation of waves and guides student through the interaction of electromagnetic waves with material boundaries. The theory of wave guides and transmission lines is also shown. The course ends with wave scattering. The knowledge gained in this course is needed for number of specialized master courses.			
AE8B17EMT	Electromagnetic Field Theory	Z,ZK	8
Students get acquainted with physics fundaments of the electromagnetic theory and with its mathematical description. Particularly, the course guides student through electrostatics, magnetostatics, introduces coupling between time varying fields and it is ends with an introduction to an electromagnetic wave. The knowledge gained in this course are needed for the subsequent course AE8B17ELD (Electrodynamics), for the course of circuit theory, theory of semiconductors and a number of specialized master courses.			
AE8B31AAC	Analog and Acitve Circuits	Z,ZK	6
The subject AE8B31AAC is oriented on presentation, matematical description, analysis and sythesis of basic analogue active circuits and function blocks of electronic systems based on basic semiconductor electronic components operating in linear and non-linear modes.			
AE8B31CIR	Circuit Theory	Z,ZK	8
The subject AE8B31CIR is a complet systematic presentation of electrical circuit theory. It is based on general physical nature of electromagnetic effects, an electric circuit is presented as a special quasistationary case of electromagnetic field. It defines basic circuit quantities (voltage, current) and basic circuit elements modeling all kinds of actual energy interactions. The subject is specifically oriented on linear electrical circuit (analogue LTI systems), it presents basic priciples and theorems of circuit theory, and analysis methods of linear circuits working in steady and transient states (modes), respectively. The time domain and frequency domain analysis is strictly differentiated. "System? characterization is applied on circuit transfer properties analysis, stability analysis, and feedback theory. At the end the subject deals with basis of discrete LTI systems theory.			
AE8B31ELE	Elements of Electronics	KZ	4
The subject AE8B31ELE (B-ELE) is a free continuation of the subject AE8B32IES (B-IES), now with technical contents yet, that provides elementary basis of electrical and electronic engineering, describes and explains common contexts among electrical phenomena, that are important for subsequent specialized subjects (for instance AE8B31CIR (B-CIR), AE8B31DIT (B-DIT), AE8B31EMT (B-EMT), AE8B31SAS (B-SAS).). The subject education uses relatively simple, elementary mathematical and physical methods adequate to the 2nd semester of the bachelor study stage. The subject provides basis of: - electromagnetic field and electrical circuit theory - semiconductor components theory - signal and system theory - digital and microprocessor technique.			
AE8B32DCL	Digital Signal Processing and Communication Laboratory	Z	2
This is a shared practical laboratory jointly practicing theoretical foundations gained in Digital Signal Processing (B-DSP), Digital Communications (B-DCM) and Data Network Theory (B-DNT) courses. It demonstrates how these areas together allow designing a complex functional system. During the course, students will design a set of building blocks based on individual pieces of knowledge from the all above stated courses allowing at the end to build complex demonstration signal processing and communication systems. The laboratory uses a computer based simulation system platform (e.g. Matlab) to practically verify the system functionality and its performance. It also demonstrates how various CAD and mathematical SW tools can be used in designing the system.			
AE8B32DNT	Data Networks Theory	Z,ZK	5
AE8B32DSP	Digital Signal Processing	Z,ZK	5
This subject is focused upon basics in the digital signal processing, systems and methods for digital signal processing.			
AE8B32IES	Introduction to Electronic Systems	Z	2
This is a motivation subject with syllabus composed of a set of demonstrations and measurements. Its content is divided into several themes. Students have a choice from this offer based on their pre-knowledge. The goal is to complete the missing knowledge and skills which may vary in students comming from various schools. The next goal is to get an idea about the scope of the OES programme.			
AE8B34EOD	Electronic and Optoelectronic Devices	Z,ZK	6
This course introduces the basic theory, principles of operation and properties of electronic and optoelectronic devices. Physical principles of operation, device structures and characteristics are explained together with adequate models for small- and large-signal. Basic applications in analogue and digital electronics are examined. In seminars and labs,			

	students are introduced to basic principles of device simulation, measurement of device characteristics and extraction of device parameters. Operation of electron devices in electronic systems is then analyzed using the PSpice simulator.		
AE8B34SST	Solid State Physics	Z,ZK	4
	The subject is aimed on solid state physics including some parts of statistical physics. The subject informs about basic properties of materials used in electronics, esp. about semiconductors.		
AE8B35FCS	Feed-Back Control Systems	Z,ZK	6
	Foundation course of automatic control. Introduction to basic concepts and properties of dynamic systems of physical, engineering, biological, economics, robotics and informatics nature. Basic principles of feedback and its use as a tool for altering the behavior of systems and managing uncertainty. Classical and modern methods for analysis and design of automatic control systems. Students specialized in systems and control will build on these ideas and knowledge in the advanced courses to follow. Students of other branches and programs will find out that control is a inspiring, ubiquitous and entertaining field worth of a future cooperation.		
AE8B37DCM	Digital Communications	Z,ZK	5
	The course provides fundamentals of digital communications theory: modulation, classical coding, channel models, and basic principles of decoding. The exposition is systematically built along the theoretical lines which allow to reveal all inner connections and principles. This allows students to develop the knowledge and use it in an active way in a design and construction of the communication systems. The course provides a necessary fundamental background for subsequent more advanced communications theory courses.		
AE8B37DIT	Digital Design	Z,ZK	5
	The goal of this course is to introduce the philosophy of digital circuits' design, to provide formal description of combinational and sequential logical circuits, their functional blocks. Both mathematical and functional description, as well as minimization algorithms for output and transient functions of digital components and circuits is presented. Karnaugh maps, latch elements, finite-state Mealy and Moore machines are the essential part of the content. The subject matter discussed will be tested on the typical design of digital circuits.		
AE8B37SAS	Signals and Systems	Z,ZK	8
	Continuous and discrete time signal representation in time and frequency domain. Stochastic signals and their parameters. Elementary principles of analog modulations with their noise conditions. Fundamental course for further study focusing on communication, measurement and signal processing.		
AE8B37SSP	Statistical Signal Processing	Z,ZK	6
	The course provides fundamentals in three main domains of the statistical signal processing: 1) estimation theory, 2) detection theory, 3) optimal and adaptive filtering. The statistical signal processing is a core theory with many applications ranging from digital communications, audio and video processing, radar and radio navigation, measurement and experiment evaluation, etc.		
AE8B38EME	Electronic Measurements	KZ	4
	The course is focused to metrology fundamentals and uncertainty apparatus. It explains both elementary principles and selected advanced methods used in electronics, telecommunications and radio communications.		
BEEZB	Safety in Electrical Engineering for a bachelor´s degree	Z	0
	The purpose of the safety course is to give the students basic knowledge of electrical equipment and installation as to avoid danger arising from operation of it. This introductory course contains fundamentals of Safety Electrical Engineering. In this way the students receive qualification of instructed person that enables them to work on electrical equipment.		
BEEZZ	Basic health and occupational safety regulations	Z	0
	The guidelines were worked out based on The Training Scheme for Health and Occupational Safety designed for employees and students of the Czech Technical University in Prague, which was provided by the Rector´s Office of the CTU. Safety is considered one of the basic duties of all employees and students. The knowledge of Health and Occupational Safety regulations forms an integral and permanent part of qualification requirements. This program is obligatory.		

For updated information see http://bilakniha.cvut.cz/en/FF.html
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