Study plan

Name of study plan: Electronics and Communications - Communication Networks and Internet

Faculty/Institute/Others: Faculty of Electrical Engineering

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Electronics and Communications

Type of study: Follow-up master full-time

Required credits: 109 Elective courses credits: 11 Sum of credits in the plan: 120

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 79

The role of the block: P

Code of the group: 2018_MEKDIP Name of the group: Diploma Thesis

Requirement credits in the group: In this group you have to gain 25 credits Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 25 Note on the group:

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
BDIP25	Diploma Thesis	Z	25	22s	L	Р

Characteristics of the courses of this group of Study Plan: Code=2018_MEKDIP Name=Diploma Thesis

BDIP25	Diploma Thesis	Z	25	
Independent final comp	rehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his o	or her branch of s	tudy, which will	
be specified by branch	department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehen	sive final examina	ation	

Code of the group: 2018_MEKP5

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 54 credits

Requirement courses in the group: In this group you have to complete 9 courses

Credits in the group: 54

Note on the group:

Specializace komunikační sítě a Internet

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
B2M32BTSA	Wireless Technologies Zdeněk Bečvář, Lukáš Vojtěch, Zbyněk Kocur, Pavel Mach Ján Kučerák Zdeněk Bečvář (Gar.)	Z,ZK	6	2P + 2L	L	Р
B2M37DKM	Digital communications Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	Z	Р
B2M37MAM	Microprocessors Petr Skalický, Stanislav Vítek Stanislav Vítek (Gar.)	Z,ZK	6	2P+2L	Z	Р
B2M32OSS	Optical Systems and Networks Jiří Weiss, Leoš Boháč Michal Lucki Leoš Boháč (Gar.)	Z,ZK	6	2P + 2L	L	Р
B2M31DSP	Advanced DSP methods Pavel Sovka, Petr Pollák Pavel Sovka Pavel Sovka (Gar.)	Z,ZK	6	2P+2C	Z,L	Р

B2M32PST	Advanced Networking Technologies Zbyněk Kocur, Leoš Boháč Leoš Boháč Leoš Boháč (Gar.)	Z,ZK	6	2P + 2C + 4D	Z	Р
B2MPROJ6	Project Jiří Jakovenko, Pavel Máša, Ivan Pravda, František Rund, Jan Šístek, Lubor Jirásek, Tomáš Zeman, Ladislav Oppl František Rund František Rund (Gar.)	Z	6	0p+6s	Z,L	Р
B2M32PRSA	Access Networks Tomáš Zeman, Jiří Vodrážka, Pavel Lafata Petr Jareš Jiří Vodrážka (Gar.)	Z,ZK	6	2P + 2L	Z	Р
B2M32RTK	Telephony Communication Control Robert Bešťák, Pavel Troller Robert Bešťák Robert Bešťák (Gar.)	Z,ZK	6	2P + 2L	L	Р

Characteristics of the courses of this group of Study Plan: Code=2018_MEKP5 Name=Compulsory subjects of the programme

B2M32BTSA Wireless Technologies

The lectures give overview of fundamental principles of wireless networks in various areas of their application. Students will understand architecture, principles and protocols used in different wireless technologies and learn how these technologies can be exploited in real world applications. The goal is to teach students how to solve problems related to deployment of wireless networks, their operation or development of wireless networks components.

B2M37DKM Digital communications

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.

B2M37MAM Microprocessors Z,ZK

The aim is to make students acquainted with the properties of microprocessor systems, make students familiar with on-chip peripherals, connect external circuit to the processor bus, and with implementation of the memory or I/O space address extension. Next, taught the students to make simple program in the assembly language, C language and combination of both. After completion of this subject student should be able to design and implement simpler microprocessor system including connection of necessary peripherals and software

B2M32OSS Optical Systems and Networks Z.ZK

The course deals with the use of optical radiation for the transmission of information. The aim is to acquaint students with the functions of important components used in an advanced optical communication systems and networks. Students will learn how to design practical optical fiber link and the network. Students will receive theoretical knowledge for the implementation of a all-optical photonic networks in the future, which will be based on a combination of wavelength multiplex with an all-optical switching.

R2M31DSP Advanced DSP methods Z.ZK

The course follows the basic course in signal processing and introduces advanced methods of analysis and digital signal processing. Graduates will learn the methods of digital signals analysis and be able to practically use them. They learn to know the conditions of use of correlation, spectral and coherent analysis of random signals. They will became familiar with methods of signal decomposition and independent component analysis and the time-frequency transformations. Emphasis will be placed on an ability to interpret the results of signal analyses

B2M32PST Advanced Networking Technologies Z,ZK

Subject Advanced Network Technologies expands students' knowledge of modern network technologies. The course is practically oriented and focused on explaining the function of advanced network protocols as used in modern data networks of today and tomorrow. Students will gain practical experience with the issues like Internet routing, software-defined networks, multicast routing, IPv6, and MPLS networks. Part of the course is also devoted to a detailed explanation of transport protocols TCP/UDP and a manner in which software applications can access transportation services of TCP/IP data networks.

B2MPROJ6 Project

Independent work in the form of a project. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The project will be defended within the framework of a subject. Project list http://www.fel.cvut.cz/en/education/semestral-projects.html

B2M32PRSA Access Networks Z,ZK

The course covers the area of high-speed transmission of information in the access network level, with emphasis on the use of optical transmission media and its combination with metallic lines (FTTx). In the practical part, students will learn the methods required for the design, modeling, measurement and analysis of transmission media, diagnostics of systems and whole access networks

R2M32RTK **Telephony Communication Control** Z,ZK

The course is oriented to audio or video issues in telecommunication networks, both fixed and mobile. Students will learn principles of switching systems and their management as well as the course will provide them with an overview of signaling systems in central exchanges and networks. The focus is on digital switching systems as circuit as packet switch oriented, i.e. so-called next generation network (NGN) and voice communication in 4G networks. (VoLTE).

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 30

The role of the block: PV

Code of the group: 2018_MEKPV5

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 30

Note on the group.

Specializace komunikační sítě a Internet

. 1010 011 1110 91	οup. '					
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
B2M32DMT	Diagnostics and Measurement in Telecommunications Zbyněk Kocur, Jiří Vodrážka Petr Jareš Jiří Vodrážka (Gar.)	Z,ZK	6	2P+2L	L	PV
B2M32DSAA	Network Application Diagnostics Radek Mařík Radek Mařík Radek Mařík Radek Mařík	Z,ZK	6	2P + 2C	Z	PV

B2M32DSVA	Distributed Computing Peter Macejko Peter Macejko Peter Macejko (Gar.)	Z,ZK	6	2P + 2C	Z	PV
B2M32IBEA	Information Security Tomáš Vaněk Petr Hampl Leoš Boháč (Gar.)	Z,ZK	6	2P + 2C	L	PV
B2M37KASA	Compression of images and signals Stanislav Vítek, František Rund, Karel Fliegel, Václav Vencovský Karel Fliegel Stanislav Vítek (Gar.)	Z,ZK	6	2P+2C	L	PV
B2M32MKSA	Mobile Networks Zdeněk Bečvář, Pavel Mach, Robert Bešťák Pavel Mach Zdeněk Bečvář (Gar.)	Z,ZK	6	2P + 2L	Z	PV
B2M32THOA	Queueing Theory Petr Hampl Petr Hampl (Gar.)	Z,ZK	6	3P + 1L	Z	PV
B2M31ZRE	Speech Processing Petr Pollák Petr Pollák Petr Pollák (Gar.)	Z,ZK	6	2P+2C	L	PV

Characteristics of the courses of this group of Study Plan: Code=2018_MEKPV5 Name=Compulsory subjects of the programme

Diagnostics and Measurement in Telecommunications

The subject builds on knowledge of basic types of interfaces used in telecommunications (from classic, via a packet-oriented and expected future generation system). Explains the importance of key parameters, presents tools for the monitoring and measurement methodology and fault diagnosis. Students verify acquired knowledge to practical tasks in the laboratory to real systems and advanced measurement techniques.

Network Application Diagnostics

The first part of the course deals with complex network structures, their characteristics identification, with recognition of both structural static and dynamic patterns, and anomaly detection. The second part of the course is focused on specification methods of static and dynamic behavior and their verification. The use of the methods is demonstrated on examples dealing with network application issues. The special treatment is dedicated not only to network and cloud applications, but also to posibilities of diagnostic process automation. The students gain sufficient skills in seminars where they solve practical problems in digital network domain.

Distributed Computing B2M32DSVA

Z,ZK

The course is focused on technologies that support distributed computing: on mechanisms ensuring reliable, efficient and secure connection of application processes, programming interfaces of communication channels and up-to-date middleware technologies. A significant part of lectures is dedicated to distributed algorithms that assure causality, exclusive access, deadlock detection/avoidance, fault-tolerance, mobile computing, and security.

B2M32IBFA Information Security

The Information Security course provides a complete source of information on the field of security of information systems and information technologies. The most of information in today society is created, transferred, stored in electronic form so information security is very important part of it. Technical background for information security is provided by cryptology.

B2M37KASA Compression of images and signals

Z,ZK

The subject deals with compression methods and techniques. Main goal is to introduce basic concepts of lossless and lossy compresion of audiovisual information (entropy, redundancy and irrelevancy). Within the laboratory exercises students will work with implementations of particular algorithms, including objective and subjective methods of quality evaluation.

B2M32MKSA Mobile Networks

Z,ZK

The lectures introduce principles and functionalities of mobile networks with special focus on currently deployed technologies and future mobile networks. Furthermore, architecture and fundamental principles of GSM, UMTS, LTE/LTE-A, and 5G will be explained. Then, selected key technologies for future mobile networks (6G) will be explained.

B2M32THOA Queueing Theory

Z,ZK

The aim of the course is to present an overview of dimensioning of telecommunication networks on the basis of results of the queuing theory (QT) and to introduce possibilities of simulation and modelling of networks, both from the point of view of grade of service (GoS) and quality of service (QoS). Results of the QT are applied on different service systems and telecommunication networks being currently operated and developed. Theoretical knowledge about models of service systems can be applied on dimensioning of different service systems in real life - not only on the telecommunications one.

B2M31ZRE Speech Processing

Z.ZK

The subject is devoted to basis of speech processing addressed to students of master program. Discussed speech technology is currently applied in many systems in different fields (e.g. information dialogue systems, voice controlled devices, dictation systems or transcription of audio-video recordings, support for language teaching, etc.). Students will learn basic algorithms for speech analysis (spectral analysis, LPC, cepstral analysis, pitch, formants, etc.), principles of speech recognition (GMM-HMM, ANN-HMM systems, small and large vocabulary recognizers), speaker recognition (based on VQ and GMM), speech synthesis or speech enhancement. Further information can be found at <:a href=https://moodle.fel.cvut.cz>Moodle FEL.

Name of the block: Elective courses Minimal number of credits of the block: 0

The role of the block: V

Code of the group: 2018_MEKH

Name of the group: Humanities subjects

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

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
B0M16FIL	Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	Z,ZK	5	2P+2S	Z,L	V
B0M16HVT	History of science and technology 2 Marcela Efmertová Marcela Efmertová (Gar.)	Z,ZK	5	2P+2S	Z,L	V

B0M16HSD1	History of economy and social studies Marcela Efmertová	Z,ZK	5	2P+2S	Z,L	V
B0M16PSM	Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	Z,ZK	5	2P+2S	Z,L	V
B0M16TEO	Theology Vladimír Slámečka Vladimír Slámečka Vladimír Slámečka (Gar.)	Z,ZK	5	2P+2S	Z,L	V

Characteristics of the courses of this group of Study Plan: Code=2018_MEKH Name=Humanities subjects

B0M16FIL		Z,ZK	5
B0M16HVT	History of science and technology 2	Z,ZK	5

This subject traces historical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate students' interest in the history and traditions of the subject, while highlighting the developments in technical education and professional organizations, the process of shaping scientific life and the influence of technical engineers

Z,ZK 5

This subject deals with the history of the Czech society in the 19th - 21th centuries. It follows the forming of the Czech political representation, its aims and achieved results as well as the social and cultural development and coexistence of the various ethnical groups in the Czech countries.

B0M16PSM	Psychology	Z,ZK	5
B0M16TEO	Theology	Z,ZK	5

This subject provides to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the basic theologic disciplines are gone through. The subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who want to get know Christianity - religion from which graws our civilization up.

Code of the group: MTV

Name of the group: Physical education

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

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
TVV	Physical education	Z	0	0+2	Z,L	V
TV-V1	Physical education	Z	1	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V

Characteristics of the courses of this group of Study Plan: Code=MTV Name=Physical education

TVV	Physical education	Z	0
TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0
TVKZV	Physical Education Course	Z	0
TVKLV	Physical Education Course	Z	0

Code of the group: 2018_MEKVOL Name of the group: Elective subjects Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group: ~Nabídku volitelných předmětů uspořádaných podle kateder najdete na webových stránkách

http://www.fel.cvut.cz/cz/education/volitelne-predmety.html\\

List of courses of this pass:

Code	Name of the course	Completion	Credits
B0M16FIL		Z,ZK	5

B0M16HSD1 History of economy and social studies Z,ZK 5 This subject deals with the history of the Czech society in the 19th - 21th centuries. It follows the forming of the Czech political representation, its aims and achieved results as well as the social and cultural development and coexistence of the various ethnical groups in the Czech countries. History of science and technology 2 This subject traces historical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate students' interest in the history and traditions of the subject, while highlighting the developments in technical education and professional organizations, the process of shaping scientific life and the influence of technical engineers B0M16PSM Psychology Z.ZK B0M16TEO Theology Z,ZK 5 This subject provides to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the basic theologic disciplines are gone through. The subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who want to get know Christianity - religion from which graws our civilization up. B2M31DSP Advanced DSP methods Z.ZK The course follows the basic course in signal processing and introduces advanced methods of analysis and digital signal processing. Graduates will learn the methods of digital signals analysis and be able to practically use them. They learn to know the conditions of use of correlation, spectral and coherent analysis of random signals. They will became familiar with methods of signal decomposition and independent component analysis and the time-frequency transformations. Emphasis will be placed on an ability to interpret the results of signal analyses. B2M31ZRE Speech Processing Z,ZK The subject is devoted to basis of speech processing addressed to students of master program. Discussed speech technology is currently applied in many systems in different fields (e.g. information dialogue systems, voice controlled devices, dictation systems or transcription of audio-video recordings, support for language teaching, etc.). Students will learn basic algorithms for speech analysis (spectral analysis, LPC, cepstral analysis, pitch, formants, etc.), principles of speech recognition (GMM-HMM, ANN-HMM systems, small and large vocabulary recognizers), speaker recognition (based on VQ and GMM), speech synthesis or speech enhancement. Further information can be found at Moodle FEL. B2M32BTSA Wireless Technologies The lectures give overview of fundamental principles of wireless networks in various areas of their application. Students will understand architecture, principles and protocols used in different wireless technologies and learn how these technologies can be exploited in real world applications. The goal is to teach students how to solve problems related to deployment of wireless networks, their operation or development of wireless networks components. B2M32DMT Diagnostics and Measurement in Telecommunications Z,ZK The subject builds on knowledge of basic types of interfaces used in telecommunications (from classic, via a packet-oriented and expected future generation system). Explains the importance of key parameters, presents tools for the monitoring and measurement methodology and fault diagnosis. Students verify acquired knowledge to practical tasks in the laboratory to real systems and advanced measurement techniques. B2M32DSAA Z.ZK **Network Application Diagnostics** The first part of the course deals with complex network structures, their characteristics identification, with recognition of both structural static and dynamic patterns, and anomaly detection. The second part of the course is focused on specification methods of static and dynamic behavior and their verification. The use of the methods is demonstrated on examples dealing with network application issues. The special treatment is dedicated not only to network and cloud applications, but also to posibilities of diagnostic process automation. The students gain sufficient skills in seminars where they solve practical problems in digital network domain. B2M32DSVA Distributed Computing The course is focused on technologies that support distributed computing: on mechanisms ensuring reliable, efficient and secure connection of application processes, programming interfaces of communication channels and up-to-date middleware technologies. A significant part of lectures is dedicated to distributed algorithms that assure causality, exclusive access, deadlock detection/avoidance, fault-tolerance, mobile computing, and security. B2M32IBEA Information Security The Information Security course provides a complete source of information on the field of security of information systems and information technologies. The most of information in today society is created, transferred, stored in electronic form so information security is very important part of it. Technical background for information security is provided by cryptology. B2M32MKSA Mobile Networks Z,ZK 6 The lectures introduce principles and functionalities of mobile networks with special focus on currently deployed technologies and future mobile networks. Furthermore, architecture and fundamental principles of GSM, UMTS, LTE/LTE-A, and 5G will be explained. Then, selected key technologies for future mobile networks (6G) will be explained. B2M32OSS Optical Systems and Networks The course deals with the use of optical radiation for the transmission of information. The aim is to acquaint students with the functions of important components used in an advanced optical communication systems and networks. Students will learn how to design practical optical fiber link and the network. Students will receive theoretical knowledge for the implementation of a all-optical photonic networks in the future, which will be based on a combination of wavelength multiplex with an all-optical switching. B2M32PRSA Access Networks Z,ZK The course covers the area of high-speed transmission of information in the access network level, with emphasis on the use of optical transmission media and its combination with metallic lines (FTTx). In the practical part, students will learn the methods required for the design, modeling, measurement and analysis of transmission media, diagnostics of systems and whole access networks. B2M32PST Z.ZK Advanced Networking Technologies Subject Advanced Network Technologies expands students' knowledge of modern network technologies. The course is practically oriented and focused on explaining the function of advanced network protocols as used in modern data networks of today and tomorrow. Students will gain practical experience with the issues like Internet routing, software-defined networks, multicast routing, IPv6, and MPLS networks. Part of the course is also devoted to a detailed explanation of transport protocols TCP/UDP and a manner in which software applications can access transportation services of TCP/IP data networks. B2M32RTK **Telephony Communication Control** Z,ZK The course is oriented to audio or video issues in telecommunication networks, both fixed and mobile. Students will learn principles of switching systems and their management as well as the course will provide them with an overview of signaling systems in central exchanges and networks. The focus is on digital switching systems as circuit as packet switch oriented. i.e. so-called next generation network (NGN) and voice communication in 4G networks. (VoLTE). B2M32THOA Queueing Theory Z,ZK The aim of the course is to present an overview of dimensioning of telecommunication networks on the basis of results of the queuing theory (QT) and to introduce possibilities of simulation and modelling of networks, both from the point of view of grade of service (GoS) and quality of service (QoS). Results of the QT are applied on different service systems and telecommunication networks being currently operated and developed. Theoretical knowledge about models of service systems can be applied on dimensioning of different service systems in real life - not only on the telecommunications one.

B2M37DKM	Digital communications	Z,ZK	6			
The course provide	he 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.						
B2M37KASA	Compression of images and signals	Z,ZK	6			
The subject deals with compression methods and techniques. Main goal is to introduce basic concepts of lossless and lossy compresion of audiovisual information (entropy, redundancy						
and irrelevancy).	Within the laboratory exercises students will work with implementations of particular algorithms, including objective and subjective m	ethods of quality e	valuation.			
B2M37MAM	Microprocessors	Z,ZK	6			
The aim is to make students acquainted with the properties of microprocessor systems, make students familiar with on-chip peripherals, connect external circuit to the processor bus,						
and with implementation of the memory or I/O space address extension. Next, taught the students to make simple program in the assembly language, C language and combination of						
both. After compl	etion of this subject student should be able to design and implement simpler microprocessor system including connection of necessi	ary peripherals and	l software			
design.						
B2MPROJ6	Project	Z	6			
Independent work in the form of a project. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or						
branc	h departments. The project will be defended within the framework of a subject. Project list http://www.fel.cvut.cz/en/education/semes	tral-projects.html				
BDIP25	Diploma Thesis	Z	25			
Independent final comprehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his or her branch of study, which will						
be specified by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehensive final examination.						
TV-V1	Physical education	Z	1			
TVKLV	Physical Education Course	Z	0			
TVKZV	Physical Education Course	Z	0			
TVV	Physical education	Z	0			
TVV0	Physical education	Z	0			

For updated information see http://bilakniha.cvut.cz/en/f3.html Generated: day 2025-11-29, time 17:01.