

# Study plan

## Name of study plan: **Electrical Engineering, Power Engineering and Management - Economy and Management of Power Eng.**

Faculty/Institute/Others: Faculty of Electrical Engineering

Department: Department of Economics, Management and Humanities

Branch of study guaranteed by the department: Economy and Management of Power Engineering

Garantor of the study branch: prof. Ing. Jaroslav Knápek, CSc.

Program of study: Electrical Engineering, Power Engineering and Management

Type of study: Follow-up master full-time

Required credits: 115

Elective courses credits: 5

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: 72

The role of the block: P

Code of the group: 2015\_MEEMEP2

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 47 credits

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

Credits in the group: 47

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) <i>Tutors, authors and guarantors (Gar.)</i>	Completion	Credits	Scope	Semester	Role
BE1M16EKL	<b>Ecology and Economy</b> <i>Jaroslav Knápek Jaroslav Knápek Jaroslav Knápek (Gar.)</i>	Z,ZK	5	3P+1S	Z	P
BE1M16FIU	<b>Financial Accounting</b> <i>Josef Černohous, Jiří Vašíček Josef Černohous Jiří Vašíček (Gar.)</i>	Z,ZK	5	2P+2S	Z	P
BE1M16FIM	<b>Financial Management</b> <i>Július Bemš, Oldřich Starý Július Bemš</i>	Z,ZK	6	2P+2C	L	P
BE1M16IND	<b>Individual project</b> <i>Jan Jandera Jan Jandera Jan Jandera (Gar.)</i>	Z	5	0P+4S	Z	P
BE1M16MAR	<b>Marketing</b> <i>Jana Polášek Filová, Ondřej Pešek Ondřej Pešek (Gar.)</i>	Z,ZK	5	2P+2S	L	P
BE1M01MEK	<b>Mathematics for Economy</b> <i>Kateřina Helisová Kateřina Helisová Kateřina Helisová (Gar.)</i>	Z,ZK	6	4P+2S	Z	P
BE1M16OVY	<b>Operations Research</b> <i>Jaroslav Knápek, Martin Dobiáš Martin Dobiáš Jaroslav Knápek (Gar.)</i>	Z,ZK	5	2P+2C	Z,L	P
BE1M16STA	<b>Statistical methods in economics</b> <i>Sherzod Tashpulatov Sherzod Tashpulatov Sherzod Tashpulatov (Gar.)</i>	Z,ZK	5	2P+2S	L	P
BE1M16SIR	<b>System Analysis and Decision Making</b> <i>Jaroslav Knápek Jaroslav Knápek Jaroslav Knápek (Gar.)</i>	Z,ZK	5	2P+2C	Z	P

### Characteristics of the courses of this group of Study Plan: Code=2015\_MEEMEP2 Name=Compulsory subjects of the programme

BE1M16EKL	Ecology and Economy	Z,ZK	5	Development of environmental protection. Sustainable development. Global environmental problems and their aspects. Greenhouse effect and climate changes. Fossil fuels, nuclear fuel cycle and environmental impacts. Support schemes for renewable energy sources utilization. Economic effectiveness of renewable energy sources projects. Regulatory and economic instruments for economic activities regulation. Externalities. Environmental indicators.
BE1M16FIU	Financial Accounting	Z,ZK	5	Principles of accounting. Assets, inventory and financial investment book keeping. Debt and equity capital. Cost, revenues and profit. Tax system and accounting. Balance sheet, profit and loss account. Cash flow statement. Analysis of company's financial position. International accounting standards. Auditing, consolidated statements. Hello.
BE1M16FIM	Financial Management	Z,ZK	6	Principles of finance, present value and alternative cost of capital, net present value, valuation of bonds and stocks, investment decision and net present value, risk and alternative cost of capital, risk and return, lease or buy, taxes, inflation and return, financial and real options, option valuation and application, hedging, short term finance, cash flow management.
BE1M16IND	Individual project	Z	5	Independent work in the form of a project. A student will choose a topic from a list of topics specified by branch department. The project will be defended within the framework of a subject.

BE1M16MAR	Marketing	Z,ZK	5
The role and functions of the marketing management. Marketing research and marketing information system. Concepts of marketing strategy. The use of product life cycle and portfolio. Marketing-mix. Product and service policy, pricing and contraction policy, communication, distribution. Controlling and audit.			
BE1M01MEK	Mathematics for Economy	Z,ZK	6
The aim is to recall the introduction to probability, familiarize students with basic terms properties and methods used in working with random processes, especially with Markov chains, and show applications of these mathematical tools in economics.			
BE1M16OVY	Operations Research	Z,ZK	5
Art of modeling and elements of decision models, Linear programming, Transportation problem, Integer linear programming, Introduction to graphs theory, Nonlinear programming, Dynamic programming, Monte Carlo simulation, Project management (CPM, PERT).			
BE1M16STA	Statistical methods in economics	Z,ZK	5
Basic Concepts. Statistical series. Assortment. Distributions of frequencies. One-dimensional descriptive characteristics. Measures of variables, coefficient of skewness, coefficient of excess. Points estimates of basic characteristics. Interval estimates of basic characteristics. Hypothesis testing of basic characteristics. Individual indexes number. Aggregative indexes. Variable-structure indexes. Multifactor indexes . Correlation and regression, Basic Concepts. Measurement of dependence intensity. Time series, concepts, qualities. Chronological average . Time series - trends and extrapolation.			
BE1M16SIR	System Analysis and Decision Making	Z,ZK	5
System approach and decision making, Decision models, Games theory, Decision making under uncertainty and risk, Decisions with multiple objectives, Stochastic programming, Expert systems, Cluster analysis			

Code of the group: 2015\_MEEMDIP

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	P

Characteristics of the courses of this group of Study Plan: Code=2015\_MEEMDIP Name=Diploma Thesis

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.			

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 39

The role of the block: PO

Code of the group: 2015\_MEEMEPO4

Name of the group: Compulsory subjects of the branch

Requirement credits in the group: In this group you have to gain 39 credits

Requirement courses in the group: In this group you have to complete 8 courses

Credits in the group: 39

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
BE1M16RES	<b>Development of Energy Systems</b> Rostislav Krejcar Rostislav Krejcar Rostislav Krejcar (Gar.)	Z,ZK	5	2P+2S	Z	PO
BE1M16EUE	<b>Economy of Energy Use</b>	Z,ZK	5	2P+2S	L	PO
BE1M15PPE	<b>Elements and Operation of Electrical Power Systems</b> Jan Hlaváček	KZ	4	2P+2S	Z	PO
BE1M16MES	<b>Management and Economics of Power Systems</b> Jaromír Vastl, Tomáš Králík Tomáš Králík Jaromír Vastl (Gar.)	Z,ZK	6	2P+2S	L	PO
BE1M16MEE	<b>Management of Power Production</b> Martin Beneš Martin Beneš Martin Beneš (Gar.)	Z,ZK	5	2P+2S	L	PO
BE1M14ESZ	<b>Power Machine Equipment</b> Evžen Thöndel Evžen Thöndel	Z,ZK	5	2P+2C	Z	PO
BE1M16DES	<b>Power Transport Systems</b> Miroslav Vítek Miroslav Vítek Miroslav Vítek (Gar.)	Z,ZK	5	2P+2S	Z	PO
BE1M16VEN	<b>Power and Heat Production</b> Martin Beneš, Jan Mikeš Jan Mikeš Martin Beneš (Gar.)	KZ	5	2P+2S	Z	PO

Characteristics of the courses of this group of Study Plan: Code=2015\_MEEMEPO4 Name=Compulsory subjects of the branch

BE1M16RES	Development of Energy Systems In this subject the basic questions of power stations design is solved. This design is discussed from viewpoint of ecology and level of used technology. Special focus is on future importance of classical and renewable energy resources. These kinds of energy resources are considered as the most important factor of future development of appropriate power industry systems. The subject provides overview of practical application of modern technologies to guarantee the development of energetic systems.	Z,ZK	5
BE1M16EUE	Economy of Energy Use Organization and energy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characterization of aggregate, secondary energy sources. Energy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and financial analysis.	Z,ZK	5
BE1M15PPE	Elements and Operation of Electrical Power Systems The course introduces basic technical principles of electricity transmission and distribution. There are explained parameters of power systems key elements, steady states, transient and failure phenomena, main principles of dimensioning and protecting, power quality and its control and electrical machines characteristics and utilization.	KZ	4
BE1M16MES	Management and Economics of Power Systems This course will give an overview of the various aspects of power supply with special emphasis on power management. The course characterises energy costs and marginal costs for determination of prices and tariffs. Energy market principles and operational decision making are integral parts of the course as well.	Z,ZK	6
BE1M16MEE	Management of Power Production Management and economic calculations, power production - electricity calculations.	Z,ZK	5
BE1M14ESZ	Power Machine Equipment The course deals with the analysis of the basic functions and characteristics of machinery used in the energy sector, introduces students to quantitative and qualitative energy balances of these devices to an extent, allowing to obtain the technical basis for the economic evaluation, as well as operating system optimization. It also deals with the analysis of the impact of failures of machine elements of the power system to the technical indicators and economical operation and performance of the most important methods of control machinery of power plants in terms of their operational optimization.	Z,ZK	5
BE1M16DES	Power Transport Systems The course is focused on economical aspects of design and operation of various technical systems for various energy forms. That is road, railway and ship transport of solid and liquid fuel, district heating system, cable car and conveyor belt transport for solid fuel and mainly grid for electricity (power) transport.	Z,ZK	5
BE1M16VEN	Power and Heat Production Power sources overview, energy processes analysis.	KZ	5

Name of the block: Elective courses

Minimal number of credits of the block: 4

The role of the block: V

Code of the group: 2015\_MEEMEVOL1

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: ~Student can choose arbitrary subject of themagister's program (EEM - Electrical Engineering, Power Engineering and Management, EK - Electronics and Communications, KYR - Cybernetics and Robotics, OI - Open Informatics, OES - Open Electronics Systems) which is not part of his curriculum. Student can choose with consideration of recommendation of the branch guarantee. You can find a selection of optional courses organized by the departments on the web site  
<http://www.fel.cvut.cz/cz/education/volitelne-predmety.html>

Code of the group: 2015\_MEEMEH

Name of the group: Humanities subjects

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 42)

Requirement courses in the group: In this group you have to complete at least 1 course ( at most 12)

Credits in the group: 4

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
BE0M16ET1	<b>Ethic 1</b>	KZ	4	2p+2s		v
BE0M16HI1	<b>History 1</b>	KZ	4	2p+2s		v
BE0M16HSD	<b>History of economy and social studies</b>	Z,ZK	4	2P+2S	L	v
BE0M16HT1	<b>History of science and technology 1</b>	KZ	4	2p+2s		v
BE0M16HT2	<b>History of science and technology 2</b>	Z,ZK	4	2P+2S	L	v
BE0M16HTE	<b>History of technology and economic</b>	ZK	2	2p+0		v
BE0M16FI1	<b>Philosophy 1</b>	KZ	4	2p+2s		v
BE0M16FI2	<b>Philosophy II</b> <i>Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)</i>	Z,ZK	4	2P+2S	L	v
BE0M16MPS	<b>Psychology</b>	Z,ZK	4	2P+2S	L	v

BE0M16MPL	<b>Psychology for Managers</b>	ZK	2	2p+0		v
BE0M16TE1	<b>Theology</b>	Z,ZK	4	2P+2S	L	v
A003TV	<b>Physical Education</b>	Z	2	0+2	L,Z	v

**Characteristics of the courses of this group of Study Plan: Code=2015\_MEEMEH Name=Humanities subjects**

BE0M16ET1	Ethic 1				KZ	4
Aim of this subject is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situations of human life. Essential parts of the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the communal answers.						
BE0M16H11	History 1				KZ	4
The main purpose of this subject is to provide a historical overview and explanation of rises and developments of mass movements and totalitarian states in 20th century. The course is based on political and econom-social history with attention to philosophic and psychologic connections.						
BE0M16HSD	History of economy and social studies				Z,ZK	4
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.						
BE0M16HT1	History of science and technology 1				KZ	4
This subject provides basic information on the development of science and technology in the world and at home from the earliest times to the present. The course is aimed primarily at explaining the significance of key levels of technology development, industrial revolutions and their impact on society.						
BE0M16HT2	History of science and technology 2				Z,ZK	4
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						
BE0M16HTE	History of technology and economic				ZK	2
The course introduces the scientific branch of the history of technology as the economic and social context of the Czech lands and Czechoslovakia in comparison with the development of the European region 19th to 21st century.						
BE0M16F11	Philosophy 1				KZ	4
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.						
BE0M16F12	Philosophy II				Z,ZK	4
The course is oriented on the transdisciplinary aspects of philosophy, informatics, physics, mathematics and biology.						
BE0M16MPS	Psychology				Z,ZK	4
BE0M16MPL	Psychology for Managers				ZK	2
Psychology of personality. Industrial and organizational psychology. Psychology in human resources management. Workgroups and teams, roles and competencies. Psychology in sales, consumer behavior analysis, psychology in marketing. Personality of a manager and leader. Time management, planning, delegation. Corporate culture.						
BE0M16TE1	Theology				Z,ZK	4
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 grows our civilization up.						
A003TV	Physical Education				Z	2

**List of courses of this pass:**

Code	Name of the course	Completion	Credits
A003TV	Physical Education	Z	2
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.			
BE0M16ET1	Ethic 1	KZ	4
Aim of this subject is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situations of human life. Essential parts of the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the communal answers.			
BE0M16F11	Philosophy 1	KZ	4
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.			
BE0M16F12	Philosophy II	Z,ZK	4
The course is oriented on the transdisciplinary aspects of philosophy, informatics, physics, mathematics and biology.			
BE0M16H11	History 1	KZ	4
The main purpose of this subject is to provide a historical overview and explanation of rises and developments of mass movements and totalitarian states in 20th century. The course is based on political and econom-social history with attention to philosophic and psychologic connections.			
BE0M16HSD	History of economy and social studies	Z,ZK	4
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.			
BE0M16HT1	History of science and technology 1	KZ	4
This subject provides basic information on the development of science and technology in the world and at home from the earliest times to the present. The course is aimed primarily at explaining the significance of key levels of technology development, industrial revolutions and their impact on society.			

BE0M16HT2	History of science and technology 2	Z,ZK	4
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			
BE0M16HTE	History of technology and economic	ZK	2
The course introduces the scientific branch of the history of technology as the economic and social context of the Czech lands and Czechoslovakia in comparison with the development of the European region 19th to 21st century.			
BE0M16MPL	Psychology for Managers	ZK	2
Psychology of personality. Industrial and organizational psychology. Psychology in human resources management. Workgroups and teams, roles and competencies. Psychology in sales, consumer behavior analysis, psychology in marketing. Personality of a manager and leader. Time management, planning, delegation. Corporate culture.			
BE0M16MPS	Psychology	Z,ZK	4
BE0M16TE1	Theology	Z,ZK	4
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 grows our civilization up.			
BE1M01MEK	Mathematics for Economy	Z,ZK	6
The aim is to recall the introduction to probability, familiarize students with basic terms properties and methods used in working with random processes, especially with Markov chains, and show applications of these mathematical tools in economics.			
BE1M14ESZ	Power Machine Equipment	Z,ZK	5
The course deals with the analysis of the basic functions and characteristics of machinery used in the energy sector, introduces students to quantitative and qualitative energy balances of these devices to an extent, allowing to obtain the technical basis for the economic evaluation, as well as operating system optimization. It also deals with the analysis of the impact of failures of machine elements of the power system to the technical indicators and economical operation and performance of the most important methods of control machinery of power plants in terms of their operational optimization.			
BE1M15PPE	Elements and Operation of Electrical Power Systems	KZ	4
The course introduces basic technical principles of electricity transmission and distribution. There are explained parameters of power systems key elements, steady states, transient and failure phenomena, main principles of dimensioning and protecting, power quality and its control and electrical machines characteristics and utilization.			
BE1M16DES	Power Transport Systems	Z,ZK	5
The course is focused on economical aspects of design and operation of various technical systems for various energy forms. That is road, railway and ship transport of solid and liquid fuel, district heating system, cable car and conveyer belt transport for solid fuel and mainly grid for electricity (power) transport.			
BE1M16EKL	Ecology and Economy	Z,ZK	5
Development of environmental protection. Sustainable development. Global environmental problems and their aspects. Greenhouse effect and climate changes. Fossil fuels, nuclear fuel cycle and environmental impacts. Support schemes for renewable energy sources utilization. Economic effectiveness of renewable energy sources projects. Regulatory and economic instruments for economic activities regulation. Externalities. Environmental indicators.			
BE1M16EUE	Economy of Energy Use	Z,ZK	5
Organization and energy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characterization of aggregate, secondary energy sources. Energy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and financial analysis.			
BE1M16FIM	Financial Management	Z,ZK	6
Principles of finance, present value and alternative cost of capital, net present value, valuation of bonds and stocks, investment decision and net present value, risk and alternative cost of capital, risk and return, lease or buy, taxes, inflation and return, financial and real options, option valuation and application, hedging, short term finance, cash flow management.			
BE1M16FIU	Financial Accounting	Z,ZK	5
Principles of accounting. Assets, inventory and financial investment book keeping. Debt and equity capital. Cost, revenues and profit. Tax system and accounting. Balance sheet, profit and loss account. Cash flow statement. Analysis of company's financial position. International accounting standards. Auditing, consolidated statements. Hello.			
BE1M16IND	Individual project	Z	5
Independent work in the form of a project. A student will choose a topic from a list of topics specified by branch department. The project will be defended within the framework of a subject.			
BE1M16MAR	Marketing	Z,ZK	5
The role and functions of the marketing management. Marketing research and marketing information system. Concepts of marketing strategy. The use of product life cycle and portfolio. Marketing-mix. Product and service policy, pricing and contractation policy, communication, distribution. Controlling and audit.			
BE1M16MEE	Management of Power Production	Z,ZK	5
Management and economic calculations, power production - elektricity calculations.			
BE1M16MES	Management and Economics of Power Systems	Z,ZK	6
This course will give an overview of the various aspects of power supply with special emphasis on power management. The course characterises energy costs and marginal costs for determination of prices and tariffs. Energy market principles and operational decision making are integral parts of the course as well.			
BE1M16OVY	Operations Research	Z,ZK	5
Art of modeling and elements of decision models, Linear programming, Transportation problem, Integer linear programming, Introduction to graphs theory, Nonlinear programming, Dynamic programming, Monte Carlo simulation, Project management (CPM, PERT).			
BE1M16RES	Development of Energy Systems	Z,ZK	5
In this subject the basic questions of power stations design is solved. This design is discussed from viewpoint of ecology and level of used technology. Special focus is on future importance of classical and renewable energy resources. These kinds of energy resources are considered as the most important factor of future development of appropriate power industry systems. The subject provides overview of practical application of modern technologies to guarantee the development of energetic systems.			
BE1M16SIR	System Analysis and Decision Making	Z,ZK	5
System approach and decision making, Decision models, Games theory, Decision making under uncertainty and risk, Decisions with multiple objectives, Stochastic programming, Expert systems, Cluster analysis			
BE1M16STA	Statistical methods in economics	Z,ZK	5
Basic Concepts. Statistical series. Assortment. Distributions of frequencies. One-dimensional descriptive characteristics. Measures of variables, coefficient of skewness, coefficient of excess. Points estimates of basic characteristics. Interval estimates of basic characteristics. Hypothesis testing of basic characteristics. Individual indexes number. Aggregative indexes. Variable-structure indexes. Multifactor indexes . Correlation and regression, Basic Concepts. Measurement of dependence intensity. Time series, concepts, qualities. Chronological average . Time series - trends and extrapolation.			

For updated information see <http://bilakniha.cvut.cz/en/f3.html>

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