

# Study plan

## Name of study plan: obor Materiálové inženýrství

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Materials Engineering

Garantor of the study branch: prof. Ing. Petr Konvalinka, CSc., Feng.

Program of study: Civil Engineering

Type of study: Follow-up master full-time

Required credits: 90

Elective courses credits: 0

Sum of credits in the plan: 90

Note on the plan: tento studijní plán platí od nástupu 2016-17

Name of the block: Compulsory courses

Minimal number of credits of the block: 55

The role of the block: Z

Code of the group: NM20160100

Name of the group: obor Materiálové inženýrství, 1. semestr

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 at least 6 courses

Credits in the group: 30

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
101MA04	<b>Mathematics 4</b> Jan Chleboun, Ivana Pultarová, Michal Beneš, Jan Lamač Jan Chleboun Jan Chleboun (Gar.)	Z,ZK	5	2P+2C	Z	z
102MSPL	<b>Advanced methods of analysis of properties of solids</b> Petr Semerák	KZ	4	2P+2C	Z	z
123CHS	<b>Chemistry of Silicate Materials</b> Martin Keppert	ZK	3	2P	Z	z
123MINZ	<b>Material Engineering 2</b>	Z,ZK	8	5P+2C	Z	z
123ZFCH	<b>Introduction to Physical Chemistry</b> Martin Keppert	Z,ZK	5	2P+2C	L	z
132PRPM	<b>Deformation and Failure of Materials</b> Milan Jirásek, Karel Mikeš, Petr Havlásek Milan Jirásek Milan Jirásek (Gar.)	Z,ZK	5	2P+2C	Z	z

### Characteristics of the courses of this group of Study Plan: Code=NM20160100 Name=obor Materiálové inženýrství, 1. semestr

101MA04	Mathematics 4	Z,ZK	5
102MSPL	Advanced methods of analysis of properties of solids	KZ	4
123CHS	Chemistry of Silicate Materials	ZK	3
The subject is dealing with chemistry of building binder on basis of silicates and related matters. Both chemistry and technology of these matters is discussed.			
123MINZ	Material Engineering 2	Z,ZK	8
Subject gives information on principles of designing and development of new types of materials having directed properties for specific building applications and structures.			
123ZFCH	Introduction to Physical Chemistry	Z,ZK	5
The subject is dealing with selected topics of physical chemistry which have some relationship to processes taking place in materials. The introduction to classic thermodynamics is given with respect to systems with chemical reaction and to systems with phase equilibrium. Attention is given also to chemical kinetics. The electrochemical part of course is devoted to general concepts of electrochemistry, to theory of electrolytes, corrosion and electrochemical power sources.			
132PRPM	Deformation and Failure of Materials	Z,ZK	5
Viscoelasticity, models for concrete creep and shrinkage. Theory of plasticity, principles of limit analysis. Fracture mechanics. Damage mechanics.			

Code of the group: NM20160200

Name of the group: obor Materiálové inženýrství, 2. semestr

Requirement credits in the group: In this group you have to gain at least 25 credits (at most 251)

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

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
123DSM	<b>Degradation of Building Materials</b> Martin Keppert	ZK	3	2P	L	z
123TPM	<b>Transport Processes in Materials</b>	Z,ZK	7	4P+2C	L	z
132KMAT	<b>Composite Materials</b> Michal Šejnoha Michal Šejnoha Michal Šejnoha (Gar.)	Z,ZK	5	2P+2C		z
132NTP2	<b>Numerical analysis of transport processes 2</b>	Z,ZK	5	2P+2C	L	z
210DPSM	<b>Diagnostics of Building Material Failures</b> Radoslav Sovják	Z,ZK	5	2P+2C		z

**Characteristics of the courses of this group of Study Plan: Code=NM20160200 Name=obor Materiálové inženýrství, 2. semestr**

123DSM	Degradation of Building Materials	ZK	3
123TPM	Transport Processes in Materials	Z,ZK	7
132KMAT	Composite Materials	Z,ZK	5
132NTP2	Numerical analysis of transport processes 2	Z,ZK	5
Numerical analysis of transport processes 2 introduces the most popular numerical methods solving stationary and non-stationary heat and moisture transfer in porous media. It covers finite difference method, finite volume method, boundary element method and finite element method. The main attention is paid to finite element method. The main principles are discussed, e.g. Galerkin's method, spatial and time discretisation, various types of finite elements and approximation functions, numerical integration. Students will practise simple benchmarks and computer implementation.			
210DPSM	Diagnostics of Building Material Failures	Z,ZK	5

Name of the block: Elective courses

Minimal number of credits of the block: 0

The role of the block: V

Code of the group: NF20150100

Name of the group: volitelná výběrová matematika

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
101YMAV	<b>Mathematics 4 - Selective Course</b> Aleš Někvinda Aleš Někvinda Aleš Někvinda (Gar.)	Z,ZK	5	2P+2C	Z	v

**Characteristics of the courses of this group of Study Plan: Code=NF20150100 Name=volitelná výběrová matematika**

101YMAV	Mathematics 4 - Selective Course	Z,ZK	5
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Name of the block: Povinně volitelné předměty, doporučení S1

Minimal number of credits of the block: 35

The role of the block: S1

Code of the group: NM20160200\_1

Name of the group: obor Materiálové inženýrství, volitelný diplomový seminář

Requirement credits in the group: In this group you have to gain 5 credits

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

Credits in the group: 5

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
102DISM	<b>Diploma Seminar</b> Jiří Novák	Z	5	4C	L	S1
123DISM	<b>Diploma Seminar</b> Alena Vimmrová	Z	5	4C	L	S1

132DISM	<b>Diploma Seminar</b> <i>Bořek Patzák</i>	Z	5	4C	L	S1
210DISM	<b>Diploma Seminar</b>	Z	5	4C		S1

**Characteristics of the courses of this group of Study Plan: Code=NM20160200\_1 Name=obor Materiálové inženýrství, volitelný diplomový seminář**

102DISM	Diploma Seminar Preliminary seminar for diploma work.	Z	5			
123DISM	Diploma Seminar In accordance with the thesis proposal	Z	5			
132DISM	Diploma Seminar in accordance with the specification	Z	5			
210DISM	Diploma Seminar	Z	5			

Code of the group: NM20160300\_1

Name of the group: obor Materiálové inženýrství, diplomová práce

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 at least 1 course

Credits in the group: 30

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
102DPM	<b>Diploma Thesis</b> <i>Pavel Novák, Petr Pokorný, Alexey Sveshnikov Jiří Novák</i>	Z	30	24C	Z	S1
123DPM	<b>Diploma Thesis</b> <i>Zdenka Bažantová, Alena Vimmrová, Zbyšek Pavlík, Milena Pavlíková, Jiří Maděra, Jaroslav Výborný, Miloš Jerman, Martin Keppert, Eva Vejmelková, ..... Alena Vimmrová</i>	Z	30	24C	Z	S1
132DPM	<b>Diploma Thesis</b> <i>Milan Jirásek, Petr Havlásek, Michal Šejnoha, Tomáš Janda, Petr Fajman, Karel Pohl, Jan Vorel, Bořek Patzák, Jan Zeman, ..... Milan Jirásek</i>	Z	30	24C	Z	S1
210DPM	<b>Diploma Thesis</b> <i>Jindřich Fornůsek, Radoslav Sovják, Petr Konvalinka, Jiří Litoš, Pavel Reiterman, Karel Kolář, Petr Máca Jiří Litoš Jiří Litoš (Gar.)</i>	Z	30	24C	Z	S1

**Characteristics of the courses of this group of Study Plan: Code=NM20160300\_1 Name=obor Materiálové inženýrství, diplomová práce**

102DPM	Diploma Thesis in accordance with the thesis proposal	Z	30			
123DPM	Diploma Thesis In accordance with the thesis proposal	Z	30			
132DPM	Diploma Thesis in accordance with the thesis proposal	Z	30			
210DPM	Diploma Thesis	Z	30			

**List of courses of this pass:**

Code	Name of the course	Completion	Credits
101MA04	Mathematics 4	Z,ZK	5
101YMAV	Mathematics 4 - Selective Course	Z,ZK	5
102DISM	Diploma Seminar Preliminary seminar for diploma work.	Z	5
102DPM	Diploma Thesis in accordance with the thesis proposal	Z	30
102MSPL	Advanced methods of analysis of properties of solids	KZ	4
123CHS	Chemistry of Silicate Materials The subject is dealing with chemistry of building binder on basis of silicates and related matters. Both chemistry and technology of these matters is discussed.	ZK	3
123DISM	Diploma Seminar In accordance with the thesis proposal	Z	5
123DPM	Diploma Thesis In accordance with the thesis proposal	Z	30
123DSM	Degradation of Building Materials	ZK	3

123MINZ	Material Engineering 2 Subject gives information on principles of designing and development of new types of materials having directed properties for specific building applications and structures.	Z,ZK	8
123TPM	Transport Processes in Materials	Z,ZK	7
123ZFCH	Introduction to Physical Chemistry The subject is dealing with selected topics of physical chemistry which have some relationship to processes taking place in materials. The introduction to classic thermodynamics is given with respect to systems with chemical reaction and to systems with phase equilibrium. Attention is given also to chemical kinetics. The electrochemical part of course is devoted to general concepts of electrochemistry, to theory of electrolytes, corrosion and electrochemical power sources.	Z,ZK	5
132DISM	Diploma Seminar in accordance with the specification	Z	5
132DPM	Diploma Thesis in accordance with the thesis proposal	Z	30
132KMAT	Composite Materials	Z,ZK	5
132NTP2	Numerical analysis of transport processes 2 Numerical analysis of transport processes 2 introduces the most popular numerical methods solving stationary and non-stationary heat and moisture transfer in porous media. It covers finite difference method, finite volume method, boundary element method and finite element method. The main attention is paid to finite element method. The main principles are discussed, e.g. Galerkin's method, spatial and time discretisation, various types of finite elements and approximation functions, numerical integration. Students will practise simple benchmarks and computer implementation.	Z,ZK	5
132PRPM	Deformation and Failure of Materials Viscoelasticity, models for concrete creep and shrinkage. Theory of plasticity, principles of limit analysis. Fracture mechanics. Damage mechanics.	Z,ZK	5
210DISM	Diploma Seminar	Z	5
210DPM	Diploma Thesis	Z	30
210DPSM	Diagnostics of Building Material Failures	Z,ZK	5

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

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