Study plan

Name of study plan: Biomedical Laboratory Methods

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Biomedical Laboratory Methods
Type of study: Follow-up master full-time
Required credits: 120
Elective courses credits: 0
Sum of credits in the plan: 120
Note on the plan:

Name of the block: Compulsory courses
Minimal number of credits of the block: 106
The role of the block: Z

Code of the group: F7PML POV 24
Name of the group: Biomedical Laboratory Methods compulsory course
Requirement credits in the group: In this group you have to gain 106 credits
Requirement courses in the group: In this group you have to complete 24 courses
Credits in the group: 106
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
F7PMLAS	**Applied Statistics** *Anna Horňáková* ***Anna Horňáková*** *Anna Horňáková (Gar.)*	Z,ZK	4	2P+2C	L	z
17BOZP	**Occupational Safety and Health, Fire Protection and First Aid** *Petr Kudrna* ***Petr Kudrna*** *Petr Kudrna (Gar.)*	Z	0	1P	Z	z
F7PMLBCH	**Biochemistry** *Pavla Bojarová, Jaroslav Racek* ***Jana Jarošová*** *Pavla Bojarová (Gar.)*	Z,ZK	6	2P+2L	Z	z
F7PMLBAS	**Biomedical Applications of Light** *Petr Písařík, Jan Mikšovský, Jan Remsa* ***Petr Písařík*** *Petr Písařík (Gar.)*	Z,ZK	4	2P+1L	L	z
F7PMLDP1	**Diploma Project I** *Daniela Obitková* ***Daniela Obitková*** *Daniela Obitková (Gar.)*	Z	4	0P+3L	Z	z
F7PMLDP2	**Diploma Project II** *Pavla Bojarová, Daniela Obitková* ***Daniela Obitková*** *Pavla Bojarová (Gar.)*	Z	4	0P+4L	L	z
F7PMLDP3	**Diploma Project III** ***Daniela Obitková***	Z	4	0P+7L	Z	z
F7PMLDP4	**Diploma Project IV**	Z	10	0P+12L	L	z
F7PMLFG	**Forensic Genetics**	Z,ZK	6	2P+2L	Z	z
F7PMLFSW	**Fundamentals of Scientific Work**	Z	4	0P+1S	L	z
F7PMLILP1	**Individual Laboratory Practice I** *Jana Jarošová* ***Jana Jarošová*** *Jana Jarošová (Gar.)*	Z	4	80XH	L	z
F7PMLILP2	**Individual Laboratory Practice II** ***Jana Jarošová***	Z	4	80XH	Z	z
F7PMLIMB1	**Instrumental Methods in Biomedicine I** *Petr Písařík, Jan Mikšovský, Vladimíra Petráková, Marie Pospíšilová, Taťána Jarošíková, Romana Široká* ***Taťána Jarošíková*** *Vladimíra Petráková (Gar.)*	Z,ZK	5	2P+2L	Z	z
F7PMLIMB2	**Instrumental Methods in Biomedicine II** *Alena Zavadilová, Martin Vlk* ***Martin Vlk*** *Alena Zavadilová (Gar.)*	ZK	5	3P+0C	L	z
F7PMLMFLP	**Mathematics and Physics for Laboratory Practice** *Petr Písařík, Milan Šiňor, David Vrba, Jana Urzová* ***Petr Písařík*** *David Vrba (Gar.)*	Z,ZK	6	2P+2C	Z	z
F7PMLMMM	**Molecular Medicine Methods** *Milan Jakubek* ***Milan Jakubek*** *Pavel Martásek (Gar.)*	Z,ZK	5	2P+2L	L	z
F7PMLMBG	**Molecular Biology and Genetics** *Taťána Jarošíková* ***Taťána Jarošíková*** *Taťána Jarošíková (Gar.)*	Z,ZK	5	2P+2L	Z	z
F7PMLNTB	**Nanotechnology in Biomedicine** ***Vladimíra Petráková***	Z,ZK	5	2P+1L	Z	z

F7PMLPIM	**Practical Training in Instrumental Methods** *Alena Zavadilová, Martin Vlk **Martin Vlk** Alena Zavadilová (Gar.)*	Z	2	0P+3L	L	z
F7PMLPFCE	**Preparation for the FCE Exam** ***Eva Motyčková** Eva Motyčková (Gar.)*	Z	2	0P+2C	L	z
F7PMLSDP	**Diploma Thesis Seminar**	Z	2	0P+1S	Z	z
F7PMLSVV	**Statistics and Results Evaluation** *Marek Piorecký, Jan Štrobl, Michaela Mrázková, Tomáš Nagy **Michaela Mrázková** Marek Piorecký (Gar.)*	Z,ZK	4	2P+2C	Z	z
F7PMLZBTI	**Fundamentals of Cellular and Tissue Engineering**	Z,ZK	5	1P+2L	Z	z
F7PMLZDP	**Diploma Thesis Preparation**	Z	6	160XH	L	z

Characteristics of the courses of this group of Study Plan: Code=F7PML POV 24 Name=Biomedical Laboratory Methods compulsory course

F7PMLAS	Applied Statistics	Z,ZK	4
17BOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0
F7PMLBCH	Biochemistry	Z,ZK	6
F7PMLBAS	Biomedical Applications of Light	Z,ZK	4
F7PMLDP1	Diploma Project I	Z	4
F7PMLDP2	Diploma Project II	Z	4
F7PMLDP3	Diploma Project III	Z	4
F7PMLDP4	Diploma Project IV	Z	10
F7PMLFG	Forensic Genetics	Z,ZK	6
F7PMLFSW	Fundamentals of Scientific Work	Z	4
F7PMLILP1	Individual Laboratory Practice I	Z	4
F7PMLILP2	Individual Laboratory Practice II	Z	4
F7PMLIMB1	Instrumental Methods in Biomedicine I	Z,ZK	5
F7PMLIMB2	Instrumental Methods in Biomedicine II	ZK	5
F7PMLMFLP	Mathematics and Physics for Laboratory Practice	Z,ZK	6
F7PMLMMM	Molecular Medicine Methods	Z,ZK	5
Hlavním cílem předmětu je prohloubit znalosti studentů o nové technologické přístupy ve zpracovávání a analýze nukleových kyselin. Vysvětlení pojmů personalizovaná či molekulární medicína otevírá studentům zcela nové obzory ve zpracování a interpretaci genetických dat v běžné biomedicínské praxi.			
F7PMLMBG	Molecular Biology and Genetics	Z,ZK	5
F7PMLNTB	Nanotechnology in Biomedicine	Z,ZK	5
F7PMLPIM	Practical Training in Instrumental Methods	Z	2
F7PMLPFCE	Preparation for the FCE Exam	Z	2
The aim of the course is to prepare students for the FCE exam (B2 First) as the most widespread of the Cambridge English exams. Passing this exam proves the ability to speak and write at the B2 level. Within the subject, students focus on all parts of the exam: writing, Use of English, reading, listening. The same emphasis is placed on the development of spoken English, with the help of conversational exercises and other activities that improve the fluency of speech and therefore increase self-confidence when communicating in the English language. The subject further focuses on a comprehensive overview of important grammatical phenomena and their use in written and spoken speech. There is a development of reading comprehension and at the same time a creative expansion of vocabulary and idioms. The acquired vocabulary is used in the simulation of real life situations. The course introduces students to important techniques and strategies for the exam during practical practice of exam tasks.			
F7PMLSDP	Diploma Thesis Seminar	Z	2
F7PMLSVV	Statistics and Results Evaluation	Z,ZK	4
The aim of the course is to get acquainted with the basic concepts of probability theory and mathematical statistics. The student is introduced to the probability model, the basic definitions of Kolmogorov's theory of probability and inductive statistics. They can apply these definitions to practical problems that arise in other areas of professional work and can explain them sufficiently (for example, doctors), they are familiar with the basic methods of inductive statistics and they can choose a suitable method for standard statistical problems.			
F7PMLZBTI	Fundamentals of Cellular and Tissue Engineering	Z,ZK	5
The aim of the subject is to acquaint students with the basics and methods of working with cell culture and their use both as a model replacement for in-vivo experiments and also as a means of preparing artificial tissue and organ replacements using tissue engineering methods. From the point of view of basic procedures, the issue of obtaining cell cultures of various phenotypes, suitable cultivation conditions, cultivation media, and instrumentation will be addressed. Substrates, biomaterials and decellularized carriers suitable for cell growth, the use of culture systems and bioreactors in terms of simulating physiological conditions and their contribution to supporting cell proliferation and differentiation for the needs of developing artificial tissue and organ replacements and 3D bioprinting technology will be addressed for application. The subject will also address the issue of legislation and regulatory conditions in connection with the use of tissue engineering for the preparation of artificial substitutes and modern therapy preparations. As part of practical laboratory exercises, topics related to the basics of working with cell culture, working in sterile conditions will be implemented; preparation of culture media; imaging of cell morphology using fluorescence microscopy and histological staining; cell culture isolation; preparation of two- and three-dimensional carriers based on nanofibers and hydrogels and their deployment in cultivation bioreactors; 3D bioprinting.			
F7PMLZDP	Diploma Thesis Preparation	Z	6

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 14
The role of the block: S

Code of the group: F7PML PV 3S 24
Name of the group: Biomedical Laboratory Methods compulsory optional course
Requirement credits in the group: In this group you have to gain at least 4 credits (at most 8)
Requirement courses in the group: In this group you have to complete at least 1 course (at most 2)
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
F7PMLGKB	**Glycoconjugates in Biomedicine**	ZK	4	2P+0C	Z	S
F7PMLPSMB	**Advanced Spectroscopic Methods in Biomedicine**	ZK	4	2P+0C	Z	S

Characteristics of the courses of this group of Study Plan: Code=F7PML PV 3S 24 Name=Biomedical Laboratory Methods compulsory optional course

F7PMLGKB	Glycoconjugates in Biomedicine	ZK	4
F7PMLPSMB	Advanced Spectroscopic Methods in Biomedicine	ZK	4

Code of the group: F7PML PV 4S 24
Name of the group: Biomedical Laboratory Methods compulsory optional course
Requirement credits in the group: In this group you have to gain at least 10 credits (at most 20)
Requirement courses in the group: In this group you have to complete at least 2 courses (at most 4)
Credits in the group: 10
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
F7PMLBIOMA	**Biomaterials and Biomaterial Characterization** ***Petr Písařík***	Z,ZK	5	2P+1L	L	S
F7PMLBIOR	**Biointerface**	Z,ZK	5	2P+1L	L	S
F7PMLCPSP	**Clean Rooms and Proper Practices for Modern Pharmaceutical Preparations**	Z,ZK	5	2P+1L	L	S
F7PMLIMUNH	**Imunohematologie**	Z,ZK	5	1P+2L	L	S

Characteristics of the courses of this group of Study Plan: Code=F7PML PV 4S 24 Name=Biomedical Laboratory Methods compulsory optional course

F7PMLBIOMA	Biomaterials and Biomaterial Characterization	Z,ZK	5
F7PMLBIOR	Biointerface	Z,ZK	5
F7PMLCPSP	Clean Rooms and Proper Practices for Modern Pharmaceutical Preparations	Z,ZK	5
Students will gain expert insight into the functioning of superclean spaces, isolators, and the basics of gas dynamics. Students will also become familiar with the requirements of clinical evaluations for medicinal products of modern therapy, with the design and division of superclean spaces for the production of these products; they will learn about the theoretical foundations and necessary components of quality assurance systems and, using the example of Good Manufacturing Practice (a system common in pharmacy), they will gain insight into the activity of production and control pharmaceutical operations of modern companies developing medicinal products for modern therapies. They will learn about the necessary legislation, requirements for validation and qualification of instruments, they will acquire the basics of metrology. In the theoretical part, students will be introduced to the latest technologies of cell and gene therapy, which are tested in clinical evaluations. In the practical part, students will try the production steps for cell preparations in super clean rooms.			
F7PMLIMUNH	Imunohematologie	Z,ZK	5

List of courses of this pass:

Code	Name of the course	Completion	Credits
17BOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0
F7PMLAS	Applied Statistics	Z,ZK	4
F7PMLBAS	Biomedical Applications of Light	Z,ZK	4
F7PMLBCH	Biochemistry	Z,ZK	6
F7PMLBIOMA	Biomaterials and Biomaterial Characterization	Z,ZK	5
F7PMLBIOR	Biointerface	Z,ZK	5
F7PMLCPSP	Clean Rooms and Proper Practices for Modern Pharmaceutical Preparations	Z,ZK	5
Students will gain expert insight into the functioning of superclean spaces, isolators, and the basics of gas dynamics. Students will also become familiar with the requirements of clinical evaluations for medicinal products of modern therapy, with the design and division of superclean spaces for the production of these products; they will learn about the theoretical foundations and necessary components of quality assurance systems and, using the example of Good Manufacturing Practice (a system common in pharmacy), they will gain insight into the activity of production and control pharmaceutical operations of modern companies developing medicinal products for modern therapies. They will learn about the necessary legislation, requirements for validation and qualification of instruments, they will acquire the basics of metrology. In the theoretical part, students will be introduced to the latest technologies of cell and gene therapy, which are tested in clinical evaluations. In the practical part, students will try the production steps for cell preparations in super clean rooms.		
F7PMLDP1	Diploma Project I	Z	4
F7PMLDP2	Diploma Project II	Z	4

F7PMLDP3	Diploma Project III	Z	4
F7PMLDP4	Diploma Project IV	Z	10
F7PMLFG	Forensic Genetics	Z,ZK	6
F7PMLFSW	Fundamentals of Scientific Work	Z	4
F7PMLGKB	Glycoconjugates in Biomedicine	ZK	4
F7PMLILP1	Individual Laboratory Practice I	Z	4
F7PMLILP2	Individual Laboratory Practice II	Z	4
F7PMLIMB1	Instrumental Methods in Biomedicine I	Z,ZK	5
F7PMLIMB2	Instrumental Methods in Biomedicine II	ZK	5
F7PMLIMUNH	Imunohematologie	Z,ZK	5
F7PMLMBG	Molecular Biology and Genetics	Z,ZK	5
F7PMLMFLP	Mathematics and Physics for Laboratory Practice	Z,ZK	6
F7PMLMMM	Molecular Medicine Methods	Z,ZK	5
Hlavním cílem předmětu je prohloubit znalosti studentů o nové technologické přístupy ve zpracovávání a analýze nukleových kyselin. Vysvětlení pojmů personalizovaná či molekulární medicína otevírá studentům zcela nové obzory ve zpracování a interpretaci genetických dat v běžné biomedicínské praxi.			
F7PMLNTB	Nanotechnology in Biomedicine	Z,ZK	5
F7PMLPFCE	Preparation for the FCE Exam	Z	2
The aim of the course is to prepare students for the FCE exam (B2 First) as the most widespread of the Cambridge English exams. Passing this exam proves the ability to speak and write at the B2 level. Within the subject, students focus on all parts of the exam: writing, Use of English, reading, listening. The same emphasis is placed on the development of spoken English, with the help of conversational exercises and other activities that improve the fluency of speech and therefore increase self-confidence when communicating in the English language. The subject further focuses on a comprehensive overview of important grammatical phenomena and their use in written and spoken speech. There is a development of reading comprehension and at the same time a creative expansion of vocabulary and idioms. The acquired vocabulary is used in the simulation of real life situations. The course introduces students to important techniques and strategies for the exam during practical practice of exam tasks.			
F7PMLPIM	Practical Training in Instrumental Methods	Z	2
F7PMLPSMB	Advanced Spectroscopic Methods in Biomedicine	ZK	4
F7PMLSDP	Diploma Thesis Seminar	Z	2
F7PMLSVV	Statistics and Results Evaluation	Z,ZK	4
The aim of the course is to get acquainted with the basic concepts of probability theory and mathematical statistics. The student is introduced to the probability model, the basic definitions of Kolmogorov's theory of probability and inductive statistics. They can apply these definitions to practical problems that arise in other areas of professional work and can explain them sufficiently (for example, doctors), they are familiar with the basic methods of inductive statistics and they can choose a suitable method for standard statistical problems.			
F7PMLZBTI	Fundamentals of Cellular and Tissue Engineering	Z,ZK	5
The aim of the subject is to acquaint students with the basics and methods of working with cell culture and their use both as a model replacement for in-vivo experiments and also as a means of preparing artificial tissue and organ replacements using tissue engineering methods. From the point of view of basic procedures, the issue of obtaining cell cultures of various phenotypes, suitable cultivation conditions, cultivation media, and instrumentation will be addressed. Substrates, biomaterials and decellularized carriers suitable for cell growth, the use of culture systems and bioreactors in terms of simulating physiological conditions and their contribution to supporting cell proliferation and differentiation for the needs of developing artificial tissue and organ replacements and 3D bioprinting technology will be addressed for application. The subject will also address the issue of legislation and regulatory conditions in connection with the use of tissue engineering for the preparation of artificial substitutes and modern therapy preparations. As part of practical laboratory exercises, topics related to the basics of working with cell culture, working in sterile conditions will be implemented; preparation of culture media; imaging of cell morphology using fluorescence microscopy and histological staining; cell culture isolation; preparation of two- and three-dimensional carriers based on nanofibers and hydrogels and their deployment in cultivation bioreactors; 3D bioprinting.			
F7PMLZDP	Diploma Thesis Preparation	Z	6

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