

MSC IN MOLECULAR BIOLOGY

Years of enrollment: **2021, 2022, 2023**

Valid from: **2022/2023/1. semester**

25/01/2024

Semester	Neptun code	Subjects	Department	Coordinator	Exam	Lessons per semester			Crd	Type	Prerequisites of taking the subject
						L	P	S			
1. Semester - foundation courses											
1	AO_MBE_ACS01	Biochemistry of Metabolism	Department of Biochemistry and Molecular Biology	Zoltán Balajthy M.Sc., Ph.D.	special ESE	28	0	14	4	Compulsory	
1	AO_MBE_BIF21	Biophysics	Department of Biophysics and Cell Biology	Andrea Dóczy-Bodnár M.Sc., Ph.D.	ESE	28	0	9	3	Compulsory	
1	AO_MBE_HET01	Human Physiology I.	Department of Physiology	János Magyar M.D.,Ph.D.,D.Sc.	special ESE	28	0	0	3	Compulsory	
1	AO_MBE_HUL01	Hungarian Language I.	Department of Foreign Languages	Katalin Rozman M.A.	AW5	0	40	0	-	Compulsory	
1	AO_MBE_MGB01	Medical Genome Biology	Department of Human Genetics	Lajos Széles M.Sc., Ph.D.	special ESE	28	42	0	5	Compulsory	
1	AO_MBE_MBE01	Methods of Molecular Biology	Department of Medical Chemistry	Beáta Lontay M.Sc., Ph.D.	special ESE	28	0	0	3	Compulsory	
1	AO_MBE_GEN01	Molecular Genetics	Department of Human Genetics	Krisztina Szirák M.Sc., Ph.D.	special ESE	28	28	0	4	Compulsory	
1	AO_MBE_IMM014	Molecular Immunology	Department of Immunology	Árpád Lányi M.Sc.,Ph.D.	special ESE	28	0	14	3	Compulsory	
1	AO_MBE_ITE01	Radioisotope Techniques in Biomedicine	Department of Medical Imaging, Division of Nuclear Medicine	György Trencsényi M.Sc., Ph.D.	ESE	28	0	0	3	Compulsory	
1	AO_MBE_ITG01	Radioisotope Techniques in Biomedicine Practical	Department of Medical Imaging, Division of Nuclear Medicine	Dezső Péter Szikra M.Sc., Ph.D.	AW5	0	14	0	1	Compulsory	together with Radioisotope Techniques in Biomedicine (AO_MBE_ITE01)
						224	124	37	29		

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						L	P	S			
2. Semester - foundation courses											
2	AO_MBE_BIE02	Bioinformatics	Department of Biochemistry and Molecular Biology	Endre Barta M.Sc.,Ph.D.	ESE	28	0	0	3	Compulsory	
2	AO_MBE_BIG02	Bioinformatics Practicals	Department of Biochemistry and Molecular Biology	Endre Barta M.Sc.,Ph.D.	AW5	0	14	0	1	Compulsory	together with Bioinformatics (AO_MBE_BIE02)
2	AO_MBE_BST02	Biostatistics	Department of Biophysics and Cell Biology	Zoltán Sándor Varga M.Sc., Ph.D., D.Sc.	ESE	14	0	0	1	Compulsory	
2	AO_MBE_CBI02	Cell and Organ Biochemistry	Department of Biochemistry and Molecular Biology	Zoltán Balajthy M.Sc., Ph.D.	special ESE	28	14	14	4	Compulsory	Biochemistry of Metabolism (AO_MBE_ACS01)
2	AO_MBE_SBI022	Cell Biology	Department of Biophysics and Cell Biology	György Vereb M.D., Ph.D., D.Sc.	special ESE	28	0	0	3	Compulsory	
2	AO_MBE_HET02	Human Physiology II.	Department of Physiology	János Magyar M.D.,Ph.D.,D.Sc.	special ESE	28	0	0	3	Compulsory	Human Physiology I. (AO_MBE_HET01)
2	AO_MBE_HEG02	Human Physiology Practicals	Department of Physiology	János Magyar M.D.,Ph.D.,D.Sc.	AW5	0	28	0	2	Compulsory	Human Physiology I. (AO_MBE_HET01) together with Human Physiology II. (AO_MBE_HET02)
2	AO_MBE_HUL02	Hungarian Language II.	Department of Foreign Languages	Katalin Rozman M.A.	AW5	0	40	0	-	Compulsory	Hungarian Language I. (AO_MBE_HUL01)
2	AO_MBE_MBG01	Methods in Molecular Biology Practicals	Department of Medical Chemistry	Beáta Lontay M.Sc., Ph.D.	AW5	0	46	0	2	Compulsory	Methods of Molecular Biology (AO_MBE_MBE01)
2	AO_MBE_PRO02	Physiology of Prokaryotes and Molecular Virology	Department of Medical Microbiology	Eszter Csoma M.Sc., Ph.D.	ESE	28	14	0	4	Compulsory	
2	AO_MBE_NBI02	Plant Molecular Biology	Department of Botany	Csaba Máthé M.Sc.,Ph.D.	ESE	28	0	28	4	Compulsory	
2	AO_MBE_PMF02	Problem-solving Exercises in Molecular Biology	Department of Botany	János Kerégyártó M.Sc.,Ph.D.	AW5	0	45	0	2	Compulsory	
						182	201	42	29		

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						L	P	S			
Freely Chosen Courses for both specialization											
3/4	AO_MBE_BIMRES	Application of modern bioinformatics methods in microbiology and metagenomics research	Institute of Metagenomics	Levente Laczkó M.Sc., Ph.D.	AW5	28	0	0	2	Freely Chosen	
3	AOG64037	Bacteriophages	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	14	6	0	1	Freely Chosen	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AOG337801	Basics of Molecular Biology and its application	Division of Clinical Physiology	Attila Tóth MSc., Ph.D., D.Sc.	AW5	30	30	0	5	Freely Chosen	
3	AO_MBE_FOOD	Food-borne diseases, foodchain safety, microbiom	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	28	0	0	2	Freely Chosen	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AOG24950	Introduction to Ayurveda and Integrative Practice of Clinical Medicine I.	Department of Pharmacology and Pharmacotherapy	Róbert Pórszász M.D., Dr. habil., MBA,Ph.D.	AW5	16	0	10	2	Freely Chosen	
3	AO_MBE_NPR03	Nobel prize and molecular biology	Non-independent Department of Radiology and Imaging Science	Teréz Nagy M.Sc., Ph.D.	ESE	14	0	0	1	Freely Chosen	
3	AO_MBE_PVIZOH	Pathogens of veterinary importance, zoonoses, One Health	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	AW5	28	0	0	2	Freely Chosen	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AOG1672001	Validation, representation and evaluation of scientific results	Department of Biochemistry and Molecular Biology	Károly Jambrovics M.Sc	AW5	14	0	14	2	Freely Chosen	
4	AOG167906	Adipose tissue biology and molecular mechanisms in the pathogenesis of obesity	Department of Biochemistry and Molecular Biology	Endre Károly Kristóf M.D.	AW5	20	0	0	1	Freely Chosen	
4	AOG24951	Introduction to Ayurveda and Integrative Practice of Clinical Medicine II.	Department of Pharmacology and Pharmacotherapy	Róbert Pórszász M.D., Dr. habil., MBA,Ph.D.	AW5	16	0	10	2	Freely Chosen	Introduction to Ayurveda and Integrative Practice of Clinical Medicine I. (AOG24950)
Prescribed in the program: 1 semester											
1	SI-003	Physical Education				0	28	0	0		
1	AOFOGY_WFS	Work and Fire Safety				1	0	0	0		
Thesis courses											
2	AO_MB_DD02	Thesis project work I.			AW5	0	70	0	5	Compulsory	
3	AO_MB_DD03	Thesis project work II.			AW5	0	150	0	10	Compulsory	Thesis I. (AO_MB_DD02)
4	AO_MB_DD04	Thesis project work III.			AW5	0	210	0	15	Compulsory	Thesis II. (AO_MB_DD03)

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2. Semester - courses of Biochemistry-Genomics specialization											
Required Elective Courses											
1	AO_MBE_BKG3	Biochemistry Practical I.	Department of Medical Chemistry	Beáta Lontay M.Sc., Ph.D.	AW5	0	42	0	2	Required Elective	
2	AO_MBE_BIP1	Bioinformatics in practice I.: introduction to processing WGS data	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	0	28	14	3	Required Elective	Bioinformatics (AO_MBE_BIE02)
2	AO_MBE_SBG42	Cell Biology Practice	Department of Biophysics and Cell Biology	Katalin Goda M.Sc., Ph.D.	AW5	0	15	0	3	Required Elective	together with Cell Biology (AO_MBE_SBI022)
2	AO_MBE_PRO04	Proteomics	Department of Biochemistry and Molecular Biology	Éva Csósz M.Sc., Ph.D.	ESE	28	28	0	4	Required Elective	
2	AO_MBE_MMS02	Structure and Function of Macromolecules	Department of Biochemistry and Molecular Biology	Mónika Fuxreiter M.Sc., Ph.D., D.Sc.	ESE	14	30	0	3	Required Elective	Medical Genome Biology (AO_MBE_GRB01)
3. Semester - courses of Biochemistry-Genomics specialization											
Required Elective Courses											
3	AO_MBE_AVBD	Analysis and visualisation of biological data	Institute of Metagenomics	Zoltán Rádai M.Sc., Ph.D.	AW5	0	14	14	2	Required Elective	
3	AO_MBE_GES03	Gene Expression Regulation – Functional Genomics	Department of Biochemistry and Molecular Biology	Beáta Scholtz M.Sc., Ph.D.	ESE	14	28	0	3	Required Elective	Medical Genom Biology (AO_MBE_MGB01)
3	AO_MBE_BGI02	Genomic Bioinformatics	Department of Biochemistry and Molecular Biology	Endre Barta M.Sc., Ph.D.	ESE	14	28	0	3	Required Elective	Medical Genome Biology (AO_MBE_MGB01)
3	AO_MBE_IMM03	Introduction to Molecular Medicine	Department of Biochemistry and Molecular Biology	Beáta Scholtz M.Sc., Ph.D.	ESE	25	0	0	2	Required Elective	Medical Genome Biology (AO_MBE_MGB01)
3	AO_MBE_PSSP	Problem solving in molecular biology: a simulation practice	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	AW5	0	28	0	2	Required Elective	
3	AO_MBE_SJF03	Signalling Pathways in the Cells	Department of Medical Chemistry	Ferenc Erdődi M.Sc., Ph.D., D.Sc.	ESE	28	0	0	3	Required Elective	Cell and Organ Biochemistry (AO_MBE_CBI02)
Module-specific Freely Chosen Courses											
3	AO_MBE_ABI03	Biochemistry of Apoptosis	Division of Dental Biochemistry	Zsuzsa Szondy M.D., Ph.D., D.Sc.	ESE	28	0	0	3	Module-specific Freely Chosen	Cell and Organ Biochemistry (AO_MBE_CBI02)
3	AO_MBE_BSZ03	Bioinorganic Chemistry	Department of Medical Chemistry	Ferenc Erdődi M.Sc., Ph.D., D.Sc.	ESE	28	0	0	3	Module-specific Freely Chosen	
3	AOG1672207	Novel regulatory mechanisms of gene expression in health and disease - Journal Club	Department of Biochemistry and Molecular Biology	Pál Krisztián Bene M.Sc., Ph.D.	AW5	30	0	0	2	Module-specific Freely Chosen	
Freely Chosen Courses											
3	AO_MBE_ITZ03	Impaired Signal Transduction in the Immune System	Department of Immunology	Kitti Pázmándi M.Sc., Ph.D.	ESE	15	0	0	2	Freely Chosen	Molecular Immunology (AO_MBE_IMM01)
3	AOG4291705	One Health: the role of animals and the environment in the evolution and epidemiology of infectious diseases	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	12	0	3	1	Freely Chosen	

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3	AOG4291505	Vaccines	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	AW5	28	0	0	2	Freely Chosen	Physiology of Prokaryotes and Molecular Virology (AO_MBE_PRO02)
4. Semester - courses of Biochemistry-Genomics specialization											
Required Elective Courses											
2	AO_MBE_BIP2	Bioinformatics in practice II.: advances in processing WGS data	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	0	28	14	3	Required Elective	Bioinformatics in practice I.: introduction to processing WGS data (AO_MBE_BIP1)
4	AO_MBE_ENZ03	Enzymology	Department of Medical Chemistry	Anita Boratkó M.Sc., Ph.D.	AW5	10	42	0	4	Required Elective	Biochemistry of Metabolism (AO_MBE_ACS01)
4	AO_MBE_FPT04	Post-translational Modification of Proteins	Department of Medical Chemistry	Andrea Kiss M.Sc., Ph.D.	ESE	28	0	0	3	Required Elective	Cell and Organ Biochemistry (AO_MBE_CBI02)
4	AO_MBE_REB04	Retroviral biochemistry	Department of Biochemistry and Molecular Biology	János Mótyán M.Sc., Ph.D.	ESE	22	0	0	3	Required Elective	
4	AO_MBE_TMC02	Selected Topics in Molecular Cell Biology	Department of Biochemistry and Molecular Biology	Beáta Scholtz M.Sc., Ph.D.	ESE	30	0	0	3	Required Elective	Methods of Molecular Biology (AO_MBE_MBE01)
Module-specific Freely Chosen Courses											
4	AO_MBE_MBKTB2	Research Techniques in Biochemistry	Department of Biochemistry and Molecular Biology	József Tózsér M.Sc., Ph.D., D.Sc.	AW5	0	60	0	3	Module-specific Freely Chosen	Biochemistry of Metabolism (AO_MBE_ACS01)
4	AO_MB_STC04	Selected topics in Cell Biology	Department of Biophysics and Cell Biology	György Vereb M.D., Ph.D., D.Sc.	ESE	24	0	0	2	Module-specific Freely Chosen	Cell Biology (AO_MBE_SBI02)
Freely Chosen Courses											
4	AO_MBE_HBI03	Basis of Conventional and Biological Immunotherapies	Department of Immunology	Árpád Lányi M.Sc., Ph.D.	ESE	30	0	0	2	Freely Chosen	Impaired Signal Transduction in the Immune System (AO_MBE_ITZ03)
4	AO_MBE_IMM02	Immunological Methods In Molecular Biology	Department of Immunology	Péter Gogolák M.Sc., Ph.D.	ESE	15	15	0	3	Freely Chosen	Molecular Immunology (AO_MBE_IMM01)
4	AO_MBE_UPI02	New System Biology Paradigms in Immunology	Department of Immunology	Kitti Pázmándi M.Sc., Ph.D.	ESE	0	0	11	3	Freely Chosen	Molecular Immunology (AO_MBE_IMM01)
4	AO_MBE_ONC1MM	Oncimmunology	Department of Immunology	Árpád Lányi M.Sc., Ph.D.	AW5	0	0	28	2	Freely Chosen	Molecular Immunology (AO_MBE_IMM01)
4	AO_MBE_BITUMI	The biology of tumour-associated immune cells	Department of Immunology	Árpád Lányi M.Sc., Ph.D.	AW5	0	0	26	2	Freely Chosen	Molecular Immunology (AO_MBE_IMM01)

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						L	P	S			
1-2. Semester - courses of Immunology, Cell and Microbiology specialization											
Required Elective Courses											
1	AO_MBE_BKG3	Biochemistry Practical I.	Department of Medical Chemistry	Beáta Lontay M.Sc., Ph.D.	AW5	0	42	0	2	Required Elective	
2	AO_MBE_BIP1	Bioinformatics in practice I.: introduction to processing WGS data	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	0	28	14	3	Required Elective	Bioinformatics (AO_MBE_BIE02)
2	AO_MBE_SBG42	Cell Biology Practice	Department of Biophysics and Cell Biology	Árpád Szőör M.D., Ph.D.	AW5	0	15	0	3	Required Elective	together with Cell Biology (AO_MBE_SBI022)
3. Semester - courses of Immunology, Cell and Microbiology specialization											
Required Elective Courses											
3	AO_MBE_AVBD	Analysis and visualisation of biological data	Institute of Metagenomics	Zoltán Rádai M.Sc., Ph.D.	AW5	0	14	14	2	Required Elective	
3	AOAKE4217	Antimicrobial chemotherapy	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	20	10	0	2	Required Elective	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AO_MBE_FVM03	Fluorescence based methods in life sciences	Department of Biophysics and Cell Biology	György Vereb M.D., Ph.D., D.Sc.	ESE	28	0	0	2	Required Elective	Biophysics (AO_MBE_BIF21) Cell Biology (AO_MBE_SBI022)
3	AO_MBE_HBE03	Human Pathogenic Bacteria	Department of Medical Microbiology	Eszter Csoma M.Sc., Ph.D.	ESE	28	0	0	2	Required Elective	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AO_MBE_HBG03	Human Pathogenic Bacteria Practicals	Department of Medical Microbiology	Eszter Csoma M.Sc., Ph.D.	AW5	0	14	0	1	Required Elective	together with Human Pathogenic Bacteria (AO_MBE_HBE03)
3	AO_MBE_HPEML	Human Pathogenic Eukaryotic Microorganisms (lectures)	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	ESE	28	0	0	2	Module-specific Freely Chosen	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AO_MBE_HPEMP	Human Pathogenic Eukaryotic Microorganisms (practices)	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	AW5	0	0	14	1	Module-specific Freely Chosen	Physiology of Prokaryotes and Molecular Virology AO_MBE_PRO02
3	AO_MBE_ITZ03	Impaired Signal Transduction in the Immune System	Department of Immunology	Kitti Pázmándi M.D., Ph.D.	ESE	15	0	0	2	Required Elective	Molecular Immunology (AO_MBE_IMM01)
3	AO_MBE_PSSP	Problem solving in molecular biology: a simulation practice	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	AW5	0	28	0	2	Required Elective	
3	AO_MBE_SJF03	Signalling Pathways in the Cells	Department of Medical Chemistry	Ferenc Erdődi M.Sc., Ph.D., D.Sc.	ESE	28	0	0	3	Required Elective	Cell and Organ Biochemistry (AO_MBE_CBI02)
3	AOG4291505	Vaccines	Institute of Metagenomics	Krisztina Szarka M.Sc., Ph.D.	AW5	28	0	0	2	Required Elective	Physiology of Prokaryotes and Molecular Virology (AO_MBE_PRO02)

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						L	P	S			
Module-specific Freely Chosen Courses											
3	AO_MBE_ABI03	Biochemistry of Apoptosis	Division of Dental Biochemistry	Zsuzsa Szondy M.D., Ph.D., D.Sc.	ESE	28	0	0	3	Module-specific Freely Chosen	Cell and Organ Biochemistry (AO_MBE_CBI02)
3	AO_MBE_BSZ03	Bioinorganic Chemistry	Department of Medical Chemistry	Ferenc Erdődi M.Sc., Ph.D., D.Sc.	ESE	28	0	0	3	Module-specific Freely Chosen	
3	AOG4291705	One Health: the role of animals and the environment in the evolution and epidemiology of infectious diseases	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	12	0	3	1	Module-specific Freely Chosen	

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						L	P	S			
4. Semester - courses of Immunology, Cell and Microbiology specialization											
Required Elective Courses											
4	AO_MBE_HBI03	Basis of Conventional and Biological Immunotherapies	Department of Immunology	Árpád Lányi M.Sc.,Ph.D.	ESE	30	0	0	2	Required Elective	Impaired Signal Transduction in the Immune System (AO_MBE_ITZ03)
2	AO_MBE_BIP2	Bioinformatics in practice II.: advances in processing WGS data	Institute of Metagenomics	Gábor Kardos M.D., Ph.D.	AW5	0	28	14	3	Required Elective	Bioinformatics in practice I.: introduction to processing WGS data (AO_MBE_BIP1)
4	AO_MBE_CAN4	Cell Analysis	Department of Biophysics and Cell Biology	György Vereb M.D., Ph.D., D.Sc.	AW5	0	28	0	2	Required Elective	Fluorescence experimental methods (AO_MBE_FVM03)
4	AO_MBE_HBE04	Human Pathogenic Viruses	Department of Medical Microbiology	György Veress M.Sc., Ph.D.	ESE	28	0	0	2	Required Elective	Physiology of Prokaryotes and Molecular Virology (AO_MBE_PRO02)
4	AO_MBE_IMM02	Immunological Methods In Molecular Biology	Department of Immunology	Péter Gogolák M.Sc.,Ph.D.	ESE	15	15	0	3	Required Elective	Molecular Immunology (AO_MBE_IMM01)
4	AO_MBE_UPI02	New System Biology Paradigms in Immunology	Department of Immunology	Kiti Pázmándi M.Sc., Ph.D.	ESE	0	0	11	3	Required Elective	Molecular Immunology (AO_MBE_IMM01)
4	AO_MBE_ONC1MM	Oncoimmunology	Department of Immunology	Árpád Lányi M.Sc.,Ph.D.	AW5	0	0	28	2	Required Elective	Molecular Immunology (AO_MBE_IMM01)
4	AO_MB_STC04	Selected topics in Cell Biology	Department of Biophysics and Cell Biology	György Vereb M.D., Ph.D., D.Sc.	ESE	24	0	0	2	Required Elective	Cell Biology (AO_MBE_SBI022)
4	AO_MBE_TMC02	Selected Topics in Molecular Cell Biology	Department of Biochemistry and Molecular Biology	Beáta Scholtz M.Sc.,Ph.D.	ESE	30	0	0	3	Required Elective	Methods of Molecular Biology (AO_MBE_MBE01)
Module-specific Freely Chosen Courses											
4	AO_MBE_NEM04	Sexually Transmitted Diseases, Congenital and Perinatal Infections	Department of Medical Microbiology	József Kónya M.D., Ph.D., D.Sc.	ESE	15	0	0	1	Module-specific Freely Chosen	Physiology of Prokaryotes and Molecular Virology (AO_MBE_PRO02)
4	AO_MBE_BITUMI	The biology of tumour-associated immune cells	Department of Immunology	Árpád Lányi M.Sc.,Ph.D.	AW5	0	0	26	2	Module-specific Freely Chosen	Molecular Immunology (AO_MBE_IMM01)
4	AOG297406	Trends and current developments in vaccination	Department of Immunology	Gábor Koncz M.Sc.,Ph.D.	ESE	28	0	0	2	Module-specific Freely Chosen	Molecular Immunology (AO_MBE_IMM01)
4	AO_MBE_ZOO04	Zoonoses	Department of Medical Microbiology	Eszter Csoma M.Sc., Ph.D.	ESE	14	0	0	1	Module-specific Freely Chosen	Physiology of Prokaryotes and Molecular Virology (AO_MBE_PRO02)

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Students have collected during their studies (Credit points):	
Compulsory Courses	58
Required Elective Courses	19
Module-specific Freely Chosen Courses	7
Freely Chosen Courses	6
Thesis project work	30
Together	120

Special Exams (determine the qualification of the degree):	
Subjects	Semester
Biochemistry of Metabolism	1
Medical Genom Biology	1
Human Physiology I.	1
Methods of Molecular Biology	1
Molecular Genetics	1
Molecular Immunology	1
Human Physiology II.	2
Cell and Organ Biochemistry	2
Cell Biology	2