

## Study plan for the Master's degree program Integrated Life Sciences

Code	Title	Course	SWS				Total ECTS	Workload averaged in ECTS				Specification exam/ ungraded tasked	Factor Grade
			V	Ü	P	S		1. Sem.	2. Sem.	3. Sem.	4. Sem.		
<b>Mandatory module</b>													
ILS-MA-M1	<b>Introduction to Statistics and Statistical Programming</b>	Introduction to Statistics	2				5		2			PL: written exam 90 min. + SL: exercise book appr. 50 pages	1
		Tutorial for Introduction to Statistics (Problem Session)		1					1.5				
		Lab class Statistical Programming		1					1.5				
<b>Total SWS and ECTS</b>			<b>2</b>	<b>2</b>			<b>5</b>		<b>5</b>				
<b>Mandatory Modules of Module group 1: Mathematical Modelling and Systems Biology</b>													
ILS-MA-M2	<b>Biomathematics</b>	Biomathematics	4				10	7				PL: oral exam 30 min. or written exam 90 min. + SL: exercise book appr.50 pages	1
		Tutorial for Biomathematics		2				3					
ILS-MA-B1	<b>Systems Biology</b>	Systems Biology	2				5	3				PL: written exam 60 min.	1
		Laboratory course Systems Biology		1				2					
<b>Total SWS and ECTS of Module Group MG1 (mandatory)</b>			<b>6</b>	<b>3</b>			<b>15</b>	<b>15</b>					
<b>Elective Modules of Module Group 1: Mathematical Modelling and Systems Biology</b>													
ILS-MA-I3	<b>Metabolic Networks II</b>	Metabolic Networks II	3				5			3		PL: oral exam 30 min.	1
		Laboratory course Metabolic Networks II		1						2			
ILS-MA-I4	<b>Spatial Modeling of Metabolic Processes</b>	Spatial Modelling of Metabolic Processes	4				10			6		PL: written exam 90 min. SL: exercise book appr.50 pages	1
		Tutorial for Spatial Modelling of Metabolic Processes		2						2			
		Laboratory course for Spatial Modelling of Metabolic Processes		2						2			
ILS-MA-M3	<b>Introduction to Mathematical Modeling</b>	Introduction to Mathematical Modeling	2				10	5				PL: oral exam 20 min. PL: oral presentation 20 min. PL: protocol 20 p.	1
		Tutorial/project for Introduction to Mathematical Modeling		2		2			5				
ILS-MA-M4	<b>Partial Differential Equations for Life Sciences</b>	Partial Differential Equations for Life Sciences	2				5		2.5			PL: written exam 60 min. SL: exercise book 50 pages	1
		Tutorial for Partial Differential Equations for Life Sciences		2						2.5			
ILS-MA-M6		Mathematical Image Processing	2				5		3			PL: oral exam 20 min.	1

	<b>Mathematical Image Processing</b>	Tutorial for Mathematical Image Processing		0.5					2				
ILS-MA-M8	<b>Stochastic Models in Life Sciences</b>	Stochastic Models in Life Sciences	2				5		3			PL: oral exam 30 min. SL: exercise book 50 pages	1
		Tutorial for Stochastic Models in Life Sciences		2					2				
ILS-MA-P1	<b>Complex Systems 1</b>	Complex Systems 1	2				5	2.5				PL: written exam 90 min.	1
		Tutorial for Complex Systems 1		2				2.5					
ILS-MA-P2	<b>Complex Systems 2</b>	Complex Systems 2	2				5		2.5			PL: written exam 90 min.	1
		Tutorial for Complex Systems 2		2					2.5				
ILS-MA-P3	<b>Complex Systems 3</b>	Complex Systems 3	2				5			2.5		PL: written exam 90 min.	1
		Tutorial for Complex Systems 3		2						2.5			
ILS-MA-P9	<b>Complex Systems 4</b>	Complex Systems 4	2				5				2.5	PL: written exam 90 min.	1
		Tutorial for Complex Systems 4		2							2.5		
ILS-MA-B11	<b>Bioanalytics</b>	Laboratory course and seminar Bioanalytics		7		1	7.5		7.5			PL: oral exam 30 min. SL: written protocol 20 p. SL: presentation 30 min.	1
<b>Total SWS and ECTS of Module Group MG 1 (elective)</b>			23	40.5	0	4	95	30	40	20	5		
<b>Mandatory Modules of Module group 2: Bioimaging and Biophysics</b>													
ILS-MA-I1A	<b>Bioimaging &amp; Biophysics A</b>	Bioimaging & Biophysics I	2				7.5	2.5				PL: written exam 90 min. or oral exam 40 min. + SL: protocol 40 pages	1
		Laboratory course for Bioimaging & Biophysics I		4				5					
ILS-MA-I1B	<b>Bioimaging &amp; Biophysics B</b>	Bioimaging & Biophysics II	2				7.5		2.5			PL: written exam 90 min. or oral exam 40 min.	1
		Laboratory course for Bioimaging & Biophysics II		4					5				
<b>Total SWS and ECTS of Module Group MG2 (mandatory)</b>			4	4			15	7.5	7.5				
<b>Elective Modules of Module Group 2: Bioimaging and Biophysics</b>													
ILS-MA-M6	<b>Mathematical Image Processing</b>	Mathematical Image Processing	2				5		3			PL: oral exam 20 min.	1
		Tutorial for Mathematical Image Processing		0.5					2				
ILS-MA-P4	<b>Modern Optics: Advanced Optics</b>	Modern Optics: Advanced Optics	2				5	2.5				PL: oral exam 30 min.	1
		Tutorial for Modern Optics: Advanced Optics		2				2.5					
ILS-MA-P5		Experimental Physics 3: Optics and Quantum Phenomena	4				7.5	5				PL: oral exam 30 min.	1

	<b>Experimental Physics 3: Optics and Quantum Phenomena</b>	Tutorial for Experimental Physics 3: Optics and Quantum Phenomena		2				2.5						
<b>ILS-MA-P10</b>	<b>Cell Adhesion and Cytoskeleton: Cell Biological, Biophysical, and Medical Aspects</b>	Cell Adhesion and Cytoskeleton: Cell Biological, Biophysical, and Medical Aspects	2				5	2.5					PL: oral exam 30 min. PL: protocol (graded tasked)	1
		Laboratory course		2				2.5						
<b>ILS-MA-B9</b>	<b>Molecular Neurophysiology</b>	Laboratory course and seminar Molecular Neurophysiology		7		1	7.5		7.5				PL: oral exam 30 min. PL: written protocol 30 p. SL: presentation 30 min.	1
<b>ILS-MA-B10</b>	<b>Methods of Modern (Confocal-) Light Microscopy</b>	Laboratory course and seminar Methods of Modern (Confocal-) Light Microscopy		5		1	5		5				PL: oral exam 30 min. SL: oral presentation 30 min.	1
<b>Total SWS and ECTS of Module Group MG 2 (elective)</b>			<b>10</b>	<b>20.5</b>	<b>0</b>	<b>2</b>	<b>40</b>	<b>17.5</b>	<b>22.5</b>	<b>0</b>	<b>0</b>			
<b>Mandatory Modules of Module group 3: Biological Structures and Processes</b>														
<b>ILS-MA-I2A</b>	<b>Interactions of Biological Macromolecules A</b>	Interactions of Biological Macromolecules A	2				5	3					PL: written exam 120 min. or oral exam 60 min. + SL: exercise book appr. 50 pages	1
		Seminar/Tutorial for Interactions of Biological Macromolecules A		1.5		0.5		2						
<b>ILS-MA-I2B</b>	<b>Interactions of Biological Macromolecules B</b>	Interactions of Biological Macromolecules B	2				5		3				PL: written exam 120 min. or oral exam 60 min.	1
		Seminar/Tutorial for Interactions of Biological Macromolecules B		1.5		0.5			2					
<b>Total SWS and ECTS of Module Group MG3 (mandatory)</b>			<b>4</b>	<b>3</b>	<b>1</b>	<b>10</b>	<b>5</b>	<b>5</b>						
<b>Elective Modules of Module Group 3: Biological Structures and Processes</b>														
<b>ILS-MA-P6</b>	<b>Introduction to X-ray and Neutron Scattering I</b>	Elastic Scattering	2				5	2.5					PL: oral exam 30 min.	1
		Tutorial for Elastic Scattering		2				2.5						
<b>ILS-MA-P7</b>	<b>Introduction to X-ray and Neutron Scattering II</b>	Inelastic Scattering	2				5		2.5				PL: oral exam 30 min.	1
		Tutorial for Inelastic Scattering		2					2.5					
<b>ILS-MA-B2</b>	<b>Ion Transport and Signal Transduction</b>	Ion Transport and Signal Transduction				1	5		2				PL: oral exam 30 min. SL: oral presentation 30 min.	1
		Laboratory course Ion Transport and Signal Transduction		5					3					
<b>ILS-MA-B4</b>	<b>Developmental Biology 2: Tissue Differentiation and Organogenesis</b>	Laboratory course and seminar Developmental Biology 2: Tissue Differentiation and Organogenesis		7		1	7.5		7.5				PL: oral exam 30 min. PL: written protocol 10-15 p. SL: oral presentation 30 min	1

<b>ILS-MA-B7</b>	<b>Structural Biology 1: Protein Design and Designer Proteins</b>	Laboratory Course and seminar Structural Biology 1: Protein Design and Designer Proteins		7		1	7.5	7.5					PL: written exam 60 min. PL: written protocol 15-20 p. PL: oral presentation 30 min.	1
<b>ILS-MA-B8</b>	<b>Structural Biology 2: Structure and Function Relationships in Biological Macromolecules</b>	Laboratory course and seminar Structural Biology 2: Structure and function relationships in biological macromolecules		7		1	7.5		7.5				PL: written exam 60 min. PL: written protocol 15-20 p. PL: oral presentation 30 min.	1
<b>ILS-MA-B12</b>	<b>Python for Bioinformatics and Data Analysis</b>	<b>Seminar and Tutorial: Python for Bioinformatics and Data Analysis</b>		7		1	7.5		7.5				PL: written exam 120 min. SL: voluntary homework (bonus to improve the grade of written exam)	1
<b>Total SWS and ECTS of Module Group MG 3 (elective)</b>			<b>4</b>	<b>46</b>	<b>0</b>	<b>6</b>	<b>57.5</b>	<b>25</b>	<b>32.5</b>	<b>0</b>	<b>0</b>			
<b>Mandatory Modules of the Specialisation Part</b>														
<b>ILS-MA-VM</b>	<b>Specialisation Module</b>	Lecture, seminar, practical training in chosen subject					20				20		PL: oral exam 30 min.	1
<b>ILS-MA-TH</b>	<b>Master's thesis</b>	Master's thesis					30				30		PL: Master's thesis appr. 20.000 words SL: Scientific report 30 min.	1
<b>Total ECTS of the Mandatory Modules (Specialisation pase)</b>							<b>50</b>				<b>20</b>	<b>30</b>		
Total ECTS (Individual Choice of Modules from MG1-MG3):							120	30	30	30	30			