

# CHEMISTRY

Course of education	2026 – 2028
Specialisation	<b>Digital Chemistry</b>
Type of study	Second-cycle studies / Master's study
Mode of study	Full-time studies
Study profile	academic
<b>Subject card search engine</b>	

During each semester, the student should obtain a minimum of 30 ECTS points from obligatory and optional classes (elective)

SEMESTER 1				2026/2027		
subject	lecture	auditorium classes	laboratory classes	TOTAL	E/P	ECTS
Education health and safety (e-learning; extended course)		5		5	PWN	0
AI in academic education		15		15	PWN	0
Repetitory in mathematics		30		30	P	3
Repetitory in general and inorganic chemistry		30		30	P	3
Repetitory in organic chemistry and biochemistry		30		30	P	3
Introduction to digital chemistry	10			10	P	1
Introduction to Python programming – lecture	15			15	E	2
Introduction to Python programming – laboratory classes			45	45	P	3
Quantum chemistry in practice – lecture	30			30	E	3
Quantum chemistry in practice – laboratory classes			45	45	P	3
Exploratory analysis of multidimensional chemical space – lecture	30			30	E	3
Exploratory analysis of multidimensional chemical space – laboratory classes			45	45	P	4
Foreign language III		30		30	P	2
<b><i>In the first semester, students complete a compulsory library course</i></b>						
<b>SEMESTER 1</b>	<b>85</b>	<b>140</b>	<b>135</b>	<b>360</b>	<b>3</b>	<b>30</b>

SEMESTER 2				2026/2027		
subject	lecture	auditorium classes	laboratory classes	TOTAL	E/P	ECTS
Introduction to R programming – lecture	15			15	E	2
Introduction to R programming – laboratory classes			45	45	P	3
Molecular mechanics & dynamics, coarse-grain modeling – lecture	30			30	E	3

Molecular mechanics & dynamics, coarse-grain modeling – laboratory classes			45	45	P	3
Specialization lecture*: - <i>Statistical mechanics in chemistry</i> - <i>Molecular descriptors</i>	30			30	P	3
Graduate laboratory*			180	180	P	12
Facultative course I: - <i>Parallel programming in Python</i> - <i>Data bases &amp; big data</i>			30	30	P	2
Facultative course II: - <i>Microcontroller-based chemical diagnosis</i> - <i>Omics analysis in chemoinformatics</i>		30		30	P	2
<b>SEMESTER 2</b>	<b>75</b>	<b>30</b>	<b>300</b>	<b>405</b>	<b>2</b>	<b>30</b>
<b>YEAR I</b>	<b>160</b>	<b>170</b>	<b>435</b>	<b>765</b>	<b>5</b>	<b>60</b>

<b>SEMESTER 3</b>				<b>2027/2028</b>		
<i>subject</i>	<i>lecture</i>	<i>auditorium classes</i>	<i>laboratory classes</i>	<i>TOTAL</i>	<i>E/P</i>	<i>ECTS</i>
Machine learning in chemistry – lecture	30			30	E	3
Machine learning in chemistry – laboratory classes			45	45	P	3
Interpersonal communication	15			15	P	1
The activities of the company in contemporary environment	30			30	P	2
MSc laboratory course*			180	180	P	10
MSc seminar		30		30	P	4
Monographic lecture*: - <i>Modern quantum chemistry in use</i> - <i>Machine learning algorithms for small datasets</i>	30			30	P	3
Facultative course III: - <i>Insights into reaction mechanisms and kinetics via quantum chemistry methods</i> - <i>QSAR in toxicology</i>			30	30	P	2
Facultative course IV: - <i>Statistical mechanics of biological macromolecules</i> - <i>Advanced nanoinformatics</i>		30		30	P	2
<b>SEMESTER 3</b>	<b>105</b>	<b>60</b>	<b>255</b>	<b>420</b>	<b>1</b>	<b>30</b>

<b>SEMESTER 4</b>				<b>2027/2028</b>		
<i>subject</i>	<i>lecture</i>	<i>auditorium classes</i>	<i>laboratory classes</i>	<i>TOTAL</i>	<i>E/P</i>	<i>ECTS</i>
Economic activity law	30			30	P	2
Introduction to statistics for life sciences	15			15	P	1
			30	30	P	2
MSc laboratory course*			190	190	P	10
MSc seminar*		30		30	P	4

Monographic lecture*: - <i>Electronic structure of molecular anions</i> - <i>Computational nanomedicine and nanotoxicology</i>	30			30	P	3
Facultative course V: - <i>Numerical methods with algorithms for physical sciences</i> - <i>Computationally added drug design</i>			30	30	P	2
Facultative course VI: - <i>Chemical bonding via quantum chemistry tools</i> - <i>Computational methods for designing advanced materials</i>		30		30	P	2
<b>Elective subjects:</b>	60			60	P	4
<i>Click, think, discover: online tools and AI in science (lecture)</i>	8			8	P	1
<i>Click, think, discover: online tools and AI in science (laboratory classes)</i>			22	22	P	3
<i>Fundamentals of molecular diagnostics (lecture + audytorium classes)</i>	15	15		30	P	4
<i>Introduction to computational quantum chemistry (lecture)</i>	30			30	P	4
<i>Radiochemical methods and radiometric techniques for environment (lecture)</i>	30			30	P	4
<i>Solid-phase synthesis in peptide-based drug design and production (lecture)</i>	30			30	P	4
<i>What is pharmacology? (lecture)</i>	30			30	P	4
MSc exam					E	
SEMESTER 4	135	60	250	445	1	30
YEAR II	240	120	505	865	2	60

E – exam

P – pass with note

PWN – pass without note

\* classes conducted at the Department, where the student is doing their master's thesis

**Second-cycle studies end with master's examination and obtaining the professional title of master's degree.**