

**MASTER BIOINFORMATIQUE**  
**Program EM Chemoinformatics+ 2024-2025 :**  
**In Silico Drug Design - Bioactive Molecules MSc**  
**Paris Cité - Degli studi di Milano**  
**(double diplôme franco-italien)**

**SEMESTRE 1 - Université Paris Cité (30 ECTS)**

<b>Methodology (A Badel, 10 ECTS)</b>	
<b>UE1</b>	<b>BQAAY000</b> Initiation to Unix and R (G. Moroy)
	<b>BQ2AY040</b> Mathematics I- Forcefield method/physical chemistry (A-C. Camproux & S. Pasquali) (3 ECTS)
	<b>BQAAY070</b> Python programming1 or
	<b>BQAAY080</b> Python programming2 (P. Fuchs & P. Poulain) (3 ECTS)
	<b>BQAAY020</b> Statistics and R (L. Regad) (3 ECTS)
	<b>BQ2AU150</b> English communication (1 ECTS)
<b>Chemistry (O Taboureau, 12 ECTS)</b>	
<b>UE2</b>	<b>BM0BY250</b> RéSO: Reactivity and organic synthesis (F. Chau) (3 ECTS)
	<b>XXX</b> Biological Chemistry (O. Reinaud) (3 ECTS)
	<b>BQ2AE170</b> Chirality - non covalente bounds (F. Maurel, O. Taboureau) (3 ECTS)
	<b>XXX</b> NMR for molecules (N. Giraud) (3 ECTS)
<b>Molecular Modelling and chemoinformatics (8 ECTS) (O. Taboureau)</b>	
<b>UE3</b>	<b>BQ2AE160</b> Chemoinformatics I (J. Diharce & V.K. Tran Nguyen) (3 ECTS)
	<b>BQ2AE140</b> Chemoinformatics II : ADME/chemometric (O. Taboureau) (2 ECTS)
	<b>BQ2AY180</b> Option in drug design / Chemoinformatics (Schrödinger software, R project + EM invited professor) (3 ECTS)

**SEMESTRE 2 - University Degli studi di Milano (30 ECTS)**

<b>UE1</b>	Programming in C Or Synthetic methods in biotechnology or organics CHIM06 courses or Chemistry module (6 ECTS)	<b>C. Lorenzo</b>
<b>UE2</b>	Structural Biology and enzymology (6 ECTS)	<b>M. Vanoni</b>
<b>UE3</b>	Medicinal chemistry (6 ECTS)	<b>L. Belvisi</b>
<b>UE4</b>	Simulation, Modelling and Biomolecules (6 ECTS)	<b>S. Pieraccini</b>
<b>UE5</b>	Chemometrics (6 ECTS)	<b>L. Belvisi</b>

**SEMESTRE 3 - Université Paris Cité (30 ECTS)**

<b>Block UE0 - Refresher course (L Regad)</b>	
<b>EC000</b> Unix and R Basics (Upgrade) (L. Regad)	
<b>EC001</b> Toxicology -Methodology upgrade (A-C Camproux)	
<b>Block UE1 - Data analysis in drug design (8 ECTS) (A-C. Camproux)</b>	
<b>EC101</b> Python programming 2 or Python project (S. Murail) (3 ECTS)	
<b>EC102</b> Data analysis in Drug Design II (A-C Camproux & L. Regad) (3 ECTS)	
<b>EC103</b> Application in Drug Design & QSAR (Taboureau & Regad) (1 ECTS)	
<b>EC104</b> Seminars and R&D (A-C Camproux) (1 ECTS)	
<b>Block UE2 - Molecular analysis and dynamics &amp; drug design (7 ECTS) (D. Flatters)</b>	
<b>EC201</b> Structural exploration of proteins (L. Regad) (3 ECTS)	
<b>EC202</b> Dynamic Target Analysis I (D. Flatters) (2 ECTS) or Dynamic analysis of targets II (G. Moroy) (2 ECTS)	
<b>EC203</b> Structural and dynamic modeling (G. Moroy & D. Flatters) (2 ECTS)	

<b>Block UE3 - Virtual screening: structure &amp; ligand-based (5 ECTS) (G. Moroy)</b>	
<b>EC301</b>	Structure-based (G. Moroy) (3 ECTS)
<b>EC302</b>	Ligand-based (O. Taboureau) (1 ECTS)
<b>EC303</b>	Hits to lead (O. Taboureau) (1 ECTS)
<b>Block UE4 - Space analysis of macromolecules (4 ECTS) (A. Badel)</b>	
<b>EC401</b>	Quantum chemistry (2 ECTS)
<b>EC402</b>	Understanding macromolecules or Data analysis I (D. Flatters) (2 ECTS)
<b>Block UE5 - Preparation for research in Drug Design (6 ECTS) (L. Regad)</b>	
<b>EC501</b>	3-projects in Drug Design (L. Regad & O. Taboureau) (2 ECTS)
<b>EC502</b>	Tutored research project design (A-C Camproux) (2 ECTS)
<b>EC503</b>	Application of virtual screening (G. Moroy) (2 ECTS)

**SEMESTRE 4 - Université Paris Diderot (30 ECTS)**

<b>UE6</b>	<b>STAGE (30 ECTS)</b>		<b>A-C. Camproux</b>
	<b>EC 601</b>	Tutored research project (A-C Camproux & S. Murail) (3 ECTS)	
	<b>EC 602</b>	Research internship (A-C Camproux) (27 ECTS)	