**MASTER IN BIOINFORMATICS (2019-2020)**

**Research course ISDD- Bioactive Molecules :**

**Design Bioactive Molecules (French diploma or franco-italian double diploma)**

**SEMESTER 1 - University of Strasbourg (30 ECTS)**

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| **UE1** | **Methodology (10 ECTS)**  Operating systems and networks  Statistical methods  Organic chemistry | G. Marcou, J.O. Dalbavie, N. Giuseppone |
| **UE2** | **Molecular Modelling (8 ECTS)**  Basics of electronic structure calculations  Molecular modelling  Drug Discovery | Rachel Schurhammer |
| **UE3** | **Chemoinformatics (10 ECTS)**  Chemoinformatics 1 & 2 &3 | A.Varnek |
| **UE4** | **Communication (2 ECTS)** | Faculté des Langues |

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

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| **UE1** | **Programming in C (6 ECTS)** | **C. Lorenzo** |
| **UE2** | **Structural Biology and enzymology (6 ECTS)** | **M. Vanoni** |
| **UE3** | **Medicinal chemistry (6 ECTS)** | **L. Belvisi** |
| **UE4** | **Simulation, Modelling and Biomolecules (6 ECTS)** | **S. Pieraccini** |
| **UE5** | **Bioactive molecules or equivalent module (6 ECTS)**   |  | | --- | | **EC 501** Synthetic methods in biotechnology or CHIM06 courses  Ou Bioinformatics & language (si Erasmus semester - French diploma) | | **L. Belvisi** |

**SEMESTER 3 - Paris Diderot University (30 ECTS)**

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| **UE0** | ***Upgrade (A-C. Camproux)***   |  | | --- | | ***EC 001*** *Unix and R base (Mise à niveau) (G. Moroy)*  ***EC 002*** *Upgrade Toxicology-Biochemistry-Chemistry (A-C Camproux)* | |
| **UE1** | **Data analysis in drug design (8 ECTS) (A-C. Camproux)**   |  | | --- | | **EC 101** Pythonproject 1 (P. Fuchs & P. Poulain) (3 ECTS)  Or depending on the level  **EC 102** PythonProgramming 2 (P. Fuchs) (3 ECTS) | | **EC 103** Data Analysis and Drug Design (A-C Camproux & L. Regad) (3 ECTS) | | **EC 104** Application in Drug Design & QSAR (O. Taboureau & L. Regad) (1 ECTS) | | **EC 105** Seminars and R&D (A-C Camproux) (1 ECTS) | |
| **UE2** | **Molecular & Drug analysis and dynamics (7 ECTS) (D. Flatters)**   |  | | --- | | **EC 201** Structural exploration of proteins (L. Regad) (3 ECTS) | | **EC 202** Dynamic Target Analysis I (D. Flatters) (2 ECTS)  Or depending on the level  **EC 203** Dynamic Target Analysis II (G. Moroy) (2 ECTS) | | **EC 204** Structural and Dynamic Modelling (G. Moroy & D. Flatters) (2 ECTS) | |
| **UE3** | **High throughput : structure & ligand-based (5 ECTS) (G. Moroy)**   |  | | --- | | **EC 301** Structure-based (G. Moroy) (3 ECTS) | | **EC 302** Ligand-based (O. Taboureau) (1 ECTS) | | **EC 303** Hits to lead (O. Taboureau) (1 ECTS) | |
| **UE4** | **Analysis of the space of molecules (4 ECTS) (O. Taboureau)**   |  | | --- | | **EC 401** Data analysis (A-C Camproux, A. Badel) (2 ECTS) | | **EC 402** Understanding macromolecules (AC Camproux, S. Murail) (2 ECTS) | |
| **UE5** | **Preparation for research in Drug Design (6 ECTS) (L. Regad)**   |  | | --- | | **EC 501** 3-projects in Drug Design tutored (L. Regad & O. Taboureau) (2 ECTS) | | **EC 502** Design of Research Project - tutored (A-C Camproux) (2 ECTS) | | **EC 503** High Throughput Screening Application (G. Moroy) (2 ECTS) | |

**SEMESTER 4 - Paris Diderot University (30 ECTS)**

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| **UE6** | **INTERNSHIP (30 ECTS) (A-C. Camproux)**   |  | | --- | | **EC 601** Preparation of tutored research project (A-C Camproux & S. Murail) (3 ECTS)  **EC 602** International or company research internship (A-C Camproux) (27 ECTS) | |