**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 networksStatistical methodsOrganic 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)**

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| **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)***

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| ***EC 001*** *Unix and R base (Mise à niveau) (G. Moroy)****EC 002*** *Upgrade Toxicology-Biochemistry-Chemistry (A-C Camproux)* |

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| **UE1** | **Data analysis in drug design (8 ECTS) (A-C. Camproux)**

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| **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) |

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| **UE2** | **Molecular & Drug analysis and dynamics (7 ECTS) (D. Flatters)**

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| **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) |

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| **UE3** | **High throughput : structure & ligand-based (5 ECTS) (G. Moroy)**

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| **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) |

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| **UE4** | **Analysis of the space of molecules (4 ECTS) (O. Taboureau)**

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| **EC 401** Data analysis (A-C Camproux, A. Badel) (2 ECTS) |
| **EC 402** Understanding macromolecules (AC Camproux, S. Murail) (2 ECTS) |

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| **UE5** | **Preparation for research in Drug Design (6 ECTS) (L. Regad)**

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| **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) |

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

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| **UE6** | **INTERNSHIP (30 ECTS) (A-C. Camproux)**

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| **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) |

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