

Master in Bio-informatics and Modelling

Focus Research

The Master in Bioinformatics and Modelling is an interdisciplinary programme that enables students to master and develop bioinformatic tools and modelling approaches to address biological questions. The curriculum is organised around 3 main topics: (1) genomics, proteomics, and evolution, (2) biophysics and structural bioinformatics, and (3) modelling dynamical systems in biology.

Bloc 1 | M-BINFA | MA-BINF

Cours de mise à niveau

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A total of ten credits chosen from the following

Module 1

BIOL-F4003
(optional)

Biologie générale et mécanismes de l'évolution | Patrick MARDULYN (Coordinator) and Martine VERCAUTEREN
⌚ 5 credits [lecture: 60h] 📅 first term 🗨️ French

CHIM-F208
(optional)

Biochimie 1 | Cyril GUEYDAN (Coordinator) and Véronique KRUYSS
⌚ 5 credits [lecture: 60h] 📅 academic year 🗨️ French

Module 2

INFO-F101
(optional)

Programmation | Thierry MASSART (Coordinator)
⌚ 10 credits [lecture: 36h, tutorial classes: 36h, practical work: 24h, project: 60h] 📅 first term 🗨️ French

Cours obligatoires

BINF-F401

Computational Methods for Functional Genomics | Vincent DETOURS (Coordinator)
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 second term

BINF-F402

Genomics, Transcriptomics and Epigenomics | Jean-François FLOT (Coordinator) and Matthieu DEFANCE
⌚ 5 credits [lecture: 48h, project: 30h] 📅 first term 🗨️ English

BINF-F403

Biophysics and structural bioinformatics I | Dimitri GILIS (Coordinator) and Fabrizio PUCCI
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨️ English

BINF-F404

Modeling dynamical systems in biology | Didier GONZE (Coordinator)
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term

BINF-F405

Biophysics and structural bioinformatics II | Dimitri GILIS (Coordinator), Fabrizio PUCCI and Wim VRANKEN
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 second term

BING-F4002

Acquisition et analyse de données | Marius GILBERT (Coordinator) and Marc DUFRENE
⌚ 5 credits [lecture: 24h, tutorial classes: 36h] 📅 first term 🗨️ French

CHIM-F422

Modélisation des rythmes du vivant | Didier GONZE (Coordinator), Geneviève DUPONT and Jean-Christophe LELOUP
⌚ 5 credits [lecture: 24h, tutorial classes: 24h, project: 30h] 📅 second term 🗨️ French

INFO-F422

Statistical foundations of machine learning | Gianluca BONTEMPI (Coordinator)
⌚ 5 credits [lecture: 24h, tutorial classes: 12h, project: 60h] 📅 second term 🗨️ English

INFO-F434

Biological databases and analysis of macromolecular sequences | Didier GONZE (Coordinator)
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨️ English

INFO-F438

[Algorithms in computational biology](#) | John IACONO (Coordinator)

🕒 5 credits [lecture: 24h, tutorial classes: 12h, project: 60h] 📅 second term 🗣️ English



Master in Bio-informatics and Modelling

Focus Research

Bloc 2 | M-BINFA | MA-BINF

Poursuite du cursus

Cours obligatoires







- MEMO-F518** **Mémoire** | Jean-François FLOT (Coordinator)
 ⌚ 25 credits [mfe/tfe: 300h] 📅 first and second terms
- STAG-F036** **Stage (en milieu académique ou industriel)** | Gianluca BONTEMPI (Coordinator)
 ⌚ 10 credits [work placement: 120h] 📅 first and second terms 🗨️ French

Cours spécifiques

Sur demande motivée de l'étudiant-e et moyennant accord du Jury, un maximum de 10 crédits de cours à options peuvent être choisis parmi les cours d'un autre Master de l'ULB (ou, de manière exceptionnelle et à titre de dérogation pour un maximum de 5 crédits, parmi les cours d'un Bachelier de l'ULB).

A total of 25 credits chosen from the following

- BINF-F501** (optional) **Determination of biomolecular structures and structural data analysis** | René WINTJENS (Coordinator)
 ⌚ 5 credits [lecture: 18h, tutorial classes: 10h, project: 32h] 📅 first term
- BING-F525** (optional) **Modélisation des écosystèmes aquatiques** | Nathalie GYPENS (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 36h] 📅 first term 🗨️ French
- BING-H4000** (optional) **Modeling and control of dynamical systems in bioengineering** | Philippe BOGAERTS (Coordinator) and Didier GONZE
 ⌚ 5 credits [lecture: 48h, tutorial classes: 12h] 📅 second term 🗨️ English
- BIOL-F208** (optional) **Biochimie et physiologie de la cellule** | Vincent RAUSSENS (Coordinator), Véronique KRUYIS and Maud MARTIN
 ⌚ 5 credits [lecture: 60h] 📅 first term 🗨️ French
- CHIM-F4001** (optional) **Rational drug design and PKPD modeling** | Jean-Christophe LELOUP (Coordinator) and Martine PREVOST
 ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, project: 24h] 📅 second term 🗨️ English
- CHIM-F443** (optional) **Approches computationnelles des états de la matière** | Nathalie VAECK (Coordinator), Antoine Aerts, Emilie CAUET and Martine PREVOST
 ⌚ 5 credits [practical work: 36h, project: 24h] 📅 first term 🗨️ French
- INFO-F409** (optional) **Learning dynamics** | Tom LENAERTS (Coordinator)
 ⌚ 5 credits [lecture: 24h, project: 60h] 📅 first term 🗨️ English
- INFO-F413** (optional) **Randomized algorithms** | Jean CARDINAL (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 12h, project: 60h] 📅 first term 🗨️ English
- INFO-F439** (optional) **Methods in Bioinformatics** | Matthieu DEFRANCE (Coordinator) and Wim VRANKEN
 ⌚ 5 credits [lecture: 24h, project: 90h] 📅 second term 🗨️ English
- INFO-H400** (optional) **Medical Information Systems** | DAVID WIKLER (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 24h, practical work: 12h] 📅 second term 🗨️ English
- INFO-H410** (optional) **Techniques of artificial intelligence** | Hugues BERSINI (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 12h] 📅 second term 🗨️ English

- INFO-H413
(optional) **Heuristic optimisation** | Thomas,T STUTZLE (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h]  second term  English
- INFO-H414
(optional) **Swarm Intelligence** | Marco DORIGO (Coordinator) and Mauro BIRATTARI
5 credits [lecture: 12h, practical work: 48h]  second term  English
- INFO-H415
(optional) **Advanced databases** | Esteban ZIMANYI (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h, practical work: 12h]  first term  English
- INFO-H500
(optional) **Image acquisition and processing** | Olivier DEBEIR (Coordinator)
5 credits [lecture: 24h, practical work: 24h]  first term  English
- INFO-H501
(optional) **Pattern recognition and image analysis** | Olivier DEBEIR (Coordinator) and Christine DECAESTECKER
5 credits [lecture: 36h, practical work: 24h]  second term  English
- INFO-H515
(optional) **Big Data: Distributed Data Management and Scalable Analytics** | Dimitrios SACHARIDIS (Coordinator) and Gianluca BONTEMPI
5 credits [lecture: 24h, tutorial classes: 12h, project: 24h]  second term  English
- PHYS-F512
(optional) **Molecular motors and stochastic processes** | Pierre GASPARD (Coordinator)
5 credits [lecture: 36h, tutorial classes: 24h]  first term  English
- STAT-F408
(optional) **Computational statistics** | Maarten JANSEN (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h, project: 100h]  second term  English