UAB
Universitat Autònoma de Barcelona

2023/2024

Master's Dissertation

Code: 42402
ECTS Credits: 15

Degree	Type	Year	Semester
4313473 Bioinformatics	OB	0	2

Contact

Name: Raquel Egea Sanchez

Email: raquel.egea@uab.cat

Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Teachers

Leonardo Pardo Carrasco

Miquel Àngel Senar Rosell

Francisco Jose Rodriguez-Trelles Astruga

Jean-Didier Marechal

Angel Gonzalez Wong

Jaime Luis Martinez Urtaza

Isaac Salazar Ciudad

Laura Masgrau Fontanet

Alejandro Peralvarez Marin

Marta Puig Font

Sonia Casillas Viladerrams

Raquel Egea Sanchez

Xavier Daura Ribera

Prerequisites

To carry out this module it is necessary to have passed previously both compulsory modules (Programming in Bioinformatics and Core Bioinformatics) and one of the optative modules.

It is recommended you have a Level B2 of English or equivalent.

Objectives and Contextualisation

The Master's Thesis (MT) is an autonomous and individually research work that gives the student the opportunity to focus on some of the topics dealt with in the academic modules of the Master, as well as, to integrate all together the capacities and competences achieved along the Master's degree.

The MT must show that the student is capable of carrying out sound and rigorous academic research. It should present an original argument that is carefully documented from primary and secondary sources. The student must do the work himself/herself with the guide of an advisor. The MT does not imply a practice internship nor the collaboration of the student in a research group or a research department. However, the work can be related to the project developed by the student during the Professional Practice Module.

Competences

- Apply research results to obtain new good and services valuating their industrial and commercial viability to transfer them to society.
- Communicate research results clearly and effectively in English.
- Conceive, design and carry out scientific, technical or industrial projects in biocomputing and be able to interpret and extract knowledge from them.
- Design and apply scientific methodology in resolving problems.
- Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context.
- Propose biocomputing solutions for problems deriving from omic research.
- Propose innovative and creative solutions in the field of study
- Students should be able to integrate knowledge and face the complexity of making judgements based on information that may be incomplete or limited and includes reflections on the social and ethical responsibilities associated with the application of their knowledge and judgements
- Students should know how to apply the knowledge they have acquired and their capacity for problem solving in new or little known fields within wider (or multidisciplinary) contexts related to the area of study
- Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously
- Use and manage bibliographical information and computer resources in the area of study
- Work individually and as part of a team in an international and multidisciplinary context.

Learning Outcomes

1. Apply research results to obtain new good and services valuating their industrial and commercial viability to transfer them to society.
2. Communicate research results clearly and effectively in English.
3. Design and apply scientific methodology in resolving problems.
4. Design and carry out a project for bioinformatics research.
5. Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context.
6. Propose innovative and creative solutions in the field of study
7. Students should be able to integrate knowledge and face the complexity of making judgements based on information that may be incomplete or limited and includes reflections on the social and ethical responsibilities associated with the application of their knowledge and judgements
8. Students should know how to apply the knowledge they have acquired and their capacity for problem solving in new or little known fields within wider (or multidisciplinary) contexts related to the area of study
9. Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously
10. Use and manage bibliographical information and computer resources in the area of study

11. Use the history of biocomputing and other related disciplines (computational biology, synthetic biology, systems biology, among others) to synthesise the current and future scope of the discipline.
12. Work individually and as part of a team in an international and multidisciplinary context.

Content

There will be several workshops/lectures during this module:

- Master thesis dissertation
- Statistical Concepts and Tools
- Bibliographic resources for your Master's Thesis

Methodology

The Master Thesis (MT) must show that the student is capable of carrying out sound and rigorous academic research. It should present an original argument that is carefully documented from primary and secondary sources. The student must do the work for oneself with the guide of an advisor.

The coordinator of the MT module appoints an academic tutor from the UAB to each student of the master, depending on the topic of his/her work.

The MT dissertation must be written under the guidance of an advisor (the academic tutor). The advisor has to be a PhD professor from a department or a research centre of the UAB. The academic tutor will supervise the student's follow-up, providing general guidance, and helping the student to refine the objective of the work and to develop the argument of the thesis. Once the student has met the academic tutor, they will consider the best date for the presentation of the dissertation and will agree on a timetable for meetings and submission of drafts.

The Master's Thesis Module is scheduled on the second term of the course and involves 375 hours of student work including the tutoring hours with the advisor. These tutoring hours will take place during several meetings, at least 3 meetings are recommended (an initial meeting, a progressing meeting and a final meeting).

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Supervised			
Regular meetings with the supervisor	10	0.4	
Type: Autonomous			
Elaboration of the Master Thesis document	365	14.6	

Assessment

To evaluate the Master Thesis (MT), the student has to deliver three printed copies of the work to the Master's Coordination and expound orally the results to the Master Thesis Committee.

The final assessment will result of:

- The delivered MT document (50%)
- The oral exposition and defense of the MT (50%)

The MT document must not exceed 15,000 words, excluding appendices and bibliography. It must be written in English.

The MT Committee will consist of thre PhD members, profesor of the UAB. The Thesis defense will include:

- A student's turn: the student exposes its work during 15 minutes approx.
- A questions turn: The three committee members ask during approx 10 minutes to evaluate the exposed thesis and ask questions to the defender.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Master Thesis Document	50%	0	0	1, 2, 3, 4, 6, 7, 8, 9, 11, 5, 12, 10
Oral presentation	50%	0	0	1, 2, 3, 4, 6, 7, 8, 9, 11, 5, 12, 10

Bibliography

Readings

- Guidance Workshop on the Master's Thesis Dissertation

- What is considered plagiarism:
  http://www.plagiarism.org
  Plagiarism JHSPH-ReferencingHandbook.pdf

- W. Zinsser. 2001. On writting well. Harper Collins.

- Writing essays and dissertations

- A David Letterman-like countdown to the 10 biggest pitfalls in scientific presentations (Naturejobs | Naturejobs Blog). 2016

- Vaux, D.L. 2012 Research methods: Know when your numbers are significant. Nature 2012 492: 180-1

- Five ways to fix statistics. Nature 2017 551:557-559

- Editorial (2017) **Responsible referencing** Nature Methods 2017 14:209

Videos

- TED: Ideas worth spreading
  Example of only words talk (TED Sarah Kay)

Example of passionate style talk (TED Hans Rosling)
Example of sense humor and criticism talk (TED Ken Robinson - The classic talk *How schools_kill_creativity*)

- Tips for Public speaking and Presentation skills

- Are you a procrastinator?

Software

- Software for creating reference lists
- PowerPoiint
- Prezi