

BIOINFORMATICS AND HIGH-THROUGHPUT DATA ANALYSIS

STUDY PLAN 2022-2023

Coordinated by:

Dr David Tamborero, Associate Professor, Karolinska Institutet, Sweden

Dr Núria López-Bigas, IRB group Leader, ICREA Research Professor, UPF Assistant Professor, ERC Consolidator Grant

GENERAL INFORMATION

Subject Name	Bioinformatics and high-throughput data analysis
Code	566660
Type	Optional
Teaching	Second semester
Coordinator	Prof. Nuria Lopez-Bigas, Dr David Tamborero
Contact Details	nuria.lopez@irbbarcelona.org, david.tamborero@scilifelab.se
ECTS credits	3

OBJECTIVES

Current technologies enable the examination of biological systems in unprecedented detail. While the use of these technologies has become widely available in clinical and research settings, the interpretation of these data remains an important bottleneck with a diversity of technological and scientific challenges. This module is aimed to review the main computational methods and available resources to analyze high-throughput data generated in biological experiments. We will alternate theoretical concepts with practical exercises in which we will use bioinformatics tools to address specific questions related with the biology of human diseases.

COMPETENCES TO BE GAINED DURING THE STUDY

Specific

S1: Understand the principles behind high throughput data and the knowledge that can be extracted

S2: Learn how to use available computational resources and methods to analyze these data

S3: Develop skills to address specific questions about human diseases by using the above

S4: Basic knowledge of biology and Genetics

THEMATIC BLOCKS

1. Introduction
1. Genomics databases and bioinformatics resources
2. High throughput data overview
3. Variant data analyses
4. Quantitative data analyses
5. Cancer genomics and clinical decision support systems
6. Computer assisted drug design
7. Network analyses

8. Integrative work

METHODOLOGY

Total training hours: 3 credits ECTS x 25h/credit = 75h

a) Face-to-face (32h):

- Lectures
- Hands-on
- Integrative work

b) Home training (43h):

- Individual and group work

EVALUATION

Evaluation criteria:

To pass the subject, students must obtain a minimum of 50 points. The score will be established as follows:

Attendance: 50% of the overall grade.

Attendance will be evaluated as: 95%-100% → 50 points / 80% - 95% → 40 points / 30-80% → 20 points / <30% → Subject Failure

Teamwork Presentation: 50% of the overall score

To pass the subject, students will have to fulfill three requisites:

Attendance-score $\geq 20/50$, Team work presentation $\geq 20/50$, and overall score (attendance + Teamwork presentation) $\geq 50/100$.

Reevaluation: In case of failing the ordinary evaluation, students will have to agree in the delivery of an additional work with the coordinators. The re-evaluation final score will never get over 50 points.

REFERENCES

References will be provided during the course.