

Genomics

Code: 45552
ECTS Credits: 6

2025/2026

Degree	Type	Year
Bioquímica, Biología Molecular y Biomedicina	OP	1

Contact

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

Languages: Lectures will be mainly in English

Postgraduates in Biochemistry, Biotechnology, Biology, Biomedicine, Genetics, Microbiology, Chemistry, Informatics/Bioinformatics, Pharmacy, Medicine and Veterinary Medicine

Objectives and Contextualisation

The overall aim of the subject is to provide students an overview of genomics including fundamentals, current techniques and applications. The specific objectives include understanding the following aspects: the diversity and complexity of eukaryotic genomes, the historical and evolutionary perspective of genomic content, the meaning and consequences of intraspecific variability, techniques commonly employed in studies of genomics, metagenomics and transcriptomics and applications derived from the knowledge provided by this science.

Learning Outcomes

1. CA07 (Competence) Integrate genomic analysis methodologies into comparative genomics research projects.
2. CA08 (Competence) Act ethically when combining functional and transcriptional genomics and understand the consequences of intraspecific variability.
3. KA10 (Knowledge) Describe the different methodologies, techniques and tools commonly used in the sequencing, assembly and annotation of genomes.
4. KA11 (Knowledge) Define the organisation, evolution, expression and population variation of the human genome.
5. KA12 (Knowledge) Write critical summaries of seminars, demonstrating an understanding of the diversity and complexity of genomes.
6. SA10 (Skill) Analyse the role of genetic alterations as dynamic genome mechanisms.
7. SA11 (Skill) Identify scientific solutions for research-related problems at the genome level and according to the complexity of organisms.
8. SA12 (Skill) Demonstrate communicative skills when presenting seminars on genomics, rigorously and clearly drawing on scientific information and terminology.

Content

Introduction to Genomics.

The human Genome.

Genomic Technologies.

Metagenomics

Transposable Elements.

Comparative Genomics: Chromosomal changes.

Comparative Genomics: Nucleotide sequence changes.

Structural variation.

Population Genomics: Theory.

Population Genomics: Data. Studies in Model Species.

Population Genomics in Humans.

Association Studies/System genetics.

Functional Genomics and Transcriptomics.

Epigenomics.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	24	0.96	CA07, CA08, KA10, KA11, KA12, SA10, SA11, CA07
Oral presentations	8	0.32	CA07, KA10, SA11, SA12, CA07
Student work, reading and learning	118	4.72	SA10, SA11, SA10

Subject teaching includes three types of activities:

- Lectures. Spoken explanations of the subject that is to be learned accompanied by powerpoint presentations to help students visualize questions and answers.
- Reading and discussion. Students are expected to read a number of research papers during the course and participate in the critical discussion of the papers in the class room.
- Oral presentations. Students will prepare a subject and make an oral and powerpoint presentation of the subject to their their peers.

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.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam	40%	0	0	CA07, CA08, KA10, KA11, SA10, SA11
Lecture attendance and participation	20%	0	0	CA07, CA08, KA12
Oral presentations	40%	0	0	CA07, CA08, KA11, SA10, SA11, SA12

Final grades are a weighed average of following items:

- Attendance and participation in the classroom (20%)
- Oral presentation and defense (40%)
- Exam (40%)

For this subject, the use of Artificial Intelligence (AI) technologies is allowed exclusively in support tasks, such as bibliographic or information search, text correction or translations. The student will have to clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how they have influenced the process and the final result of the activity. Non-transparency of the use of AI in this assessable activity will be considered a lack of academic honesty and may result in a partial or total penalty in the grade of the activity, or greater penalties in cases of seriousness

Not assessable

Students will be graded as "Not assessed" when the weight of the evaluation in which they have participated is less than the equivalent of 50% of the final grade of the module.

Bibliography

Basic books

- Gibson, G. & S. V. Muse, 2009 (3rd edition). A Primer of Genome Science. Sinauer, Massachusetts. USA.
- Brown, T. A. 2023. Genomes 5 (5th edition). Garland Science, New York, USA.
- Lesk, A.M. 2017. Introduction to genomics (3rd edition). Oxford University Press, Oxford, UK.
- Lynch, M. 2007. The origins of genome architecture. Sinauer.
- Strachan, T. & A. Lucassen, 2023. Genetics and Genomics in Medicine (2nd edition). CRC Press

Useful links

<http://bioinformatica.uab.es/mastergp>
UAB Virtual Campus: <https://cv2008.uab.cat/>
Entrez Genome Database: <http://www.ncbi.nlm.nih.gov/genome>

Software

NA

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(TEm) Theory (master)	1	English	first semester	morning-mixed