UAB
Universitat Autònoma de Barcelona

Genetics

Code: 101913
ECTS Credits: 6

2024/2025

Degree	Type	Year
2501230 Biomedical Sciences	FB	1

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Being a course in the first semester of the first course of the degree, it will not be necessary to have previously knowledge or skills given by any of the courses of the degree.

However, the course cannot "start from scratch" since the learning of Genetics is part of the studies in secondary school. Basic knowledge of Genetics will ease the achievement of the competences of the course.

Objectives and Contextualisation

The science of Genetics studies all related to the hereditary material and inheritance of living beings. It is a basic and fundamental subject in biomedical sciences. The student will acquire a vision from the molecular point of view to population and evolutionary levels of organization. The main goals of this subject are: the comprehension of the basis and mechanisms of the inheritance; the genetic analysis of experimental data and the interpretation of the results; as well as, to achieve a global vision of Genetics.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Describe biomedical problems in terms of causes, mechanisms and treatments.
- Display knowledge of the basic life processes on several levels of organisation: molecular, cellular, tissues, organs, individual and populations.
- Display knowledge of the concepts and language of biomedical sciences in order to follow biomedical literature correctly.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.

- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Describe the laws of heredity and the transmission mechanisms of hereditary characteristics.
3. Describe the processes of replication, expression and regulation of the genome.
4. Explain the genetic basis for biological variability and evolution.
5. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
6. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
7. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
8. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
9. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
10. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
11. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
12. Understand the functional and organisational structure of hereditary material.
13. Use the bibliographic sources specific to cell biology, cytology and histology and genetics to work independently on acquiring further knowledge.
14. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Content

1.- Introduction to genetics.

2.- Classical genetics analisis. The chromosomal basis of inheritance.

3.- Independent assortment. Extensions of Mendelian genetics.

4.- Non-Mendelian inheritance.

5.- Human pedigree analysis and genetic counseling.

6.- Mapping eukaryote chromosomes by recombination.

7.- Quantitative genetics.

8.- Genetic material.

9.- Mutation and repair.

10.- Gene expression.

11.- Regulation of transcription.

12.- Population genetics and evolution.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Masterclass	36	1.44	12, 3, 2, 4
Problems	8	0.32	13
Type: Supervised			
Tutorials	4	0.16	13
Type: Autonomous			
Autostudy	70	2.8	12, 3, 2, 4, 13
Problem solving	15	0.6	13
Reading and bibliographic search	8	0.32	13

The contents of the subject of Genetics are aimed at providing students with a general introduction to the basic concepts of Genetics in order to understand the laws of heredity, its cytological and molecular basis and its variation at the cellular and population levels. These contents include: mendelism; type of heredity; interaction genes and environment; sex determination; ligation and recombination; genetic maps; cytogenetics; structure, organization and metabolism of genetic material; gene regulation; genomics and transcriptomics; mutation and repair of DNA; population and quantitative genetics; evolution.

Theory classes: The student acquires scientific knowledge of the subject by attending theoretical classes, which will be complemented by personal study of the topics covered.

Classes of problems: The knowledge acquired during the theory classes and during the personal study will be applied to solve practical cases. During these problem classes, students will expose problems, acquiring the ability to synthesize, interpret data, and communicate orally.

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
Assigment submission	10%	2	0.08	1, 11, 5, 8, 7, 14
First partial examination	45%	3.5	0.14	12, 3, 2, 4, 10, 9, 6, 13
Second partial examination	45%	3.5	0.14	12, 3, 2, 4, 10, 9, 6, 13

In order to evaluate the progressive comprehension and acquisition of the contents, both theory and problems, 2 partial evaluation tests will be carried out that will eliminate matter. The grade of each partial will correspond to 45% of the final grade. In order to pass the partial tests and be able to average, the student must obtain a minimum grade of 5 in each of the tests. Each partial evaluation can be retaken if the grade is <5.

In any situation, the course is passed with a final grade of at least 5.

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course. Therefore, students will obtain the grade "Not Assessable" when the evaluation activities carried out have a weighting of less than 67% in the final grade.

Students who cannot attend an assessment test for a justified reason and provide the corresponding documentation will have the right to take the test at another time in agreement with the professor.

Repeating students must take all the tests required to pass the subject.

A 10% of the final grade will correspond to an assigment submission.

Single assessment option: The single assessment option consists of a single test in which the contents of the entire program (TE and PAUL) of the subject will be evaluated. The test will consist of multiple choice questions. The grade obtained in this test will represent 100% of the final grade for the subject. The single evaluation test will be done coinciding with the same date set in the calendar for the last continuous evaluation test and the same retake procedure will be applied as for the continuous evaluation.

Bibliography

1. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C., Carroll, S.B. "Introduction to Genetic Analysis". W.H. Freeman and Co. McGraw-Hill /Interamericana de España, 2008, 8th edition.

2. Pierce, Benjamin A. "Genética un enfoque conceptual", Editorial MédicaPanamericana, 2015, 5th edition.

3. Pierce, Benjamin A. "Fundamentos de genética", Editorial MédicaPanamericana, 2011.

Klug, W.S., Cummings M.R., Spencer C.A., Palladino M.A. "Concepts of genetics". Pearson, 2013, 10th edition.

5. Benito C., Espino FJ. "Genetics: Essential Concepts". Panamericana, 2012.

6. Benito C. "141 Problemas de genética: resueltos paso a paso". Synthesis, 2015.

7. JL cantilever. "Genetics: Problems and exercises solved". Pearson Educación, 2003.

Web:

http://www.ncbi.nlm.nih.gov/books/?term=genetics

Aula Virtual de l'Autònoma Interactiva: https://cv2008.uab.cat

Spanish Society of Genetics: http://www.segenetica.es/

http://bioinf3.uab.cat/genmoodle

Translated with www.DeepL.com/Translator

Software

There is no specific software required

Language list

Name	Group	Language	Semester	Turn
(SEM) Seminars	511	Spanish	first semester	morning-mixed
(SEM) Seminars	512	Spanish	first semester	morning-mixed
(TE) Theory	51	Spanish	first semester	afternoon