

Degree programme	Type	Course
Biomedical Sciences	FB	1

Contact lecturer

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Prerequisites

As this is a first-semester course in the Bachelor's Degree in Biomedical Sciences, no prior knowledge of the other courses in the degree programme is required. However, a basic understanding of genetics acquired during secondary education is necessary to successfully follow and benefit from the course.

Group languages

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

Objectives

Genetics is the science that studies all aspects of the hereditary material of living organisms. It is a fundamental subject in Biomedical Sciences, encompassing all levels of biological organization, from the molecular level to the population and evolutionary levels. The main objectives of this course are to understand the principles and mechanisms of inheritance, develop the ability to perform genetic analyses, design genetic experiments and interpret the resulting data, and acquire a historical perspective that enables students to summarize the major milestones in the history of genetics and appreciate their contributions to modern biology.

Learning outcomes

- CM06 (Evaluate the ethical aspects of genetics, with respect for fundamental rights and duties, diversity and democratic values.) Evaluate the ethical aspects of genetics, with respect for fundamental rights and duties, diversity and democratic values.
- KM07 (Describe the genetic alterations that form the basis of certain pathologies.) Describe the genetic alterations that form the basis of certain pathologies.
- KM08 (Detail ethical standards and regulations in the field of genetics.) Detail ethical standards and regulations in the field of genetics.
- SM07 (Interpret the results of cell biology and genetics experiments.) Interpret the results of cell biology and genetics experiments.
- SM08 (Identify the type of inheritance of a given genotype-phenotype based on a pedigree.) Identify the type of inheritance of a given genotype-phenotype based on a pedigree.
- SM09 (Apply the legal and ethical standards in the development and application of genetics.) Apply the legal and ethical standards in the development and application of genetics.

Contents

1.- Introduction to genetics.

2.- Classical genetics analysis. 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.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Reading and bibliographic search	8	0.32	CM06, KM07, KM08, SM07, SM08, SM09
Masterclass	36	1.44	KM07, KM08, SM07, SM08, SM09
Tutorials	4	0.16	KM07, KM08, SM07, SM08, SM09
Problem solving	15	0.6	KM07, SM07, SM08
Problems	8	0.32	KM07, KM08, SM07, SM08, SM09
Autostudy	70	2.8	CM06, KM07, KM08, SM07, SM08, SM09

The contents of the Genetics course are designed to provide students with a general introduction to the fundamental concepts of genetics, enabling them to understand the principles of inheritance, their cytological and molecular basis, and their variation at both the cellular and population levels. The course covers the following topics: Mendelian genetics; patterns of inheritance; gene-environment interactions; sex determination; genetic linkage and recombination; genetic mapping; cytogenetics; the structure, organization, and metabolism of genetic material; gene regulation; genomics and transcriptomics; DNA mutation and repair; population and quantitative genetics; and evolution.

Lectures: Students acquire the scientific knowledge specific to the course by attending lectures, which are complemented by independent study of the topics covered.

Problem-solving sessions: The knowledge acquired during lectures and through independent study is applied to the resolution of practical problems and case studies. During these sessions, students present and discuss problem solutions, thereby developing their skills in synthesis, data interpretation, and oral communication.

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

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Second partial examination	45%	3.5	0.14	KM07, SM07, SM08
Assignment submission	10%	2	0.08	CM06, KM07, KM08, SM07, SM08, SM09
First partial examination	45%	3.5	0.14	KM07, SM07, SM08

To assess students' understanding and progressive acquisition of both theoretical and practical content, two cumulative midterm examinations will be held. Each midterm examination will account for 45% of the final course grade. To pass both midterm examinations and be eligible for grade averaging, students must obtain a minimum score of 5 out of 10 on each examination. Students who fail to achieve this minimum score on either midterm will not be allowed to average the two grades and must take the corresponding material in the resit examination.

A minimum final grade of 5 out of 10 is required to pass the course.

To be eligible for the resit examination, students must have previously completed assessment activities representing at least two-thirds (67%) of the total course grade. Students whose completed assessment activities account for less than 67% of the final grade will receive the status "Not Assessable."

Students who are unable to attend an assessment for a justified reason and provide the appropriate supporting documentation will be entitled to take the assessment at an alternative date agreed with the course instructor.

Students repeating the course must complete all assessment activities required to pass the course.

A written assignment will account for 10% of the final course grade.

The use of Artificial Intelligence (AI) technologies is not permitted at any stage of this course. Any assignment containing AI-generated content will be considered a breach of academic integrity and may result in a partial or total loss of marks for the assessment, as well as more severe disciplinary sanctions where appropriate.

Any irregularity committed during an assessment activity (including academic fraud, plagiarism, or the improper use of AI, unless such use is expressly authorized in the course syllabus) that may lead to a significant alteration of the assessment outcome will result in a grade of 0 for that assessment activity. If the course syllabus establishes that passing the course requires obtaining a minimum grade in that assessment activity, or if multiple irregularities are committed in the assessment activities of the same course, the final grade for the course will be 0. In addition, disciplinary proceedings may be initiated against any student who commits any of these irregularities.

Single assessment: The single assessment consists of one comprehensive examination covering all course content (TE and PAUL). The examination will consist of multiple-choice questions. The grade obtained in this examination will account for 100% of the final course grade. The single assessment examination will be held on the same date scheduled for the final continuous assessment examination, and the same resit regulations that apply to continuous assessment will also apply to the single assessment.

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 F.J. "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.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	51	Spanish	first semester	afternoon
(SEM) Seminars	511	Spanish	first semester	morning-mixed
(SEM) Seminars	512	Spanish	first semester	morning-mixed