UAB
Universitat Autònoma de Barcelona

Genetics

2026/2027

Code: 100777
Credits: 6

Degree programme	Type	Course
Biology	FB	1

Contact lecturer

Name : Alba Garcia Rodriguez

Email : alba.garcia.rodriguez@uab.cat

Teaching staff

Marta García García

Barbara Negre De Bofarull

Group languages

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

Prerequisites

There are no official prerequisites other than those for access to the degree. Nonetheless, it is recommended to review the subjects seen during high school regarding genetics, cell division, probability calculation and basic statistics.

Objectives

The main objectives are:

- The understanding of the bases and mechanisms of biological inheritance as well as those of genetic improvement
- The ability to perform genetic analysis of the different characteristics of living organisms
- The ability to design and obtain information on genetic experiments as well as to interpret the results obtained

Learning outcomes

- CM11 (Design genetics and genomics experiments adapted to the different fields of biology and respecting ethical principles and social needs.) Design genetics and genomics experiments adapted to the different fields of biology and respecting ethical principles and social needs.
- KM16 (Describe the structure and organisation of nucleic acids in different groups of organisms.) Describe the structure and organisation of nucleic acids in different groups of organisms.
- KM17 (Define the mechanisms of heredity and the processes that regulate gene expression, as well as

the fundamentals of genetic improvement.) Define the mechanisms of heredity and the processes that regulate gene expression, as well as the fundamentals of genetic improvement.
- KM18 (Identify the basic genetic mechanisms of evolutionary change.) Identify the basic genetic mechanisms of evolutionary change.
- KM19 (Identify the specific bibliographic sources in genetics that allow, in an autonomous way, to develop and extend the knowledge acquired.) Identify the specific bibliographic sources in genetics that allow, in an autonomous way, to develop and extend the knowledge acquired.
- SM13 (Carry out diferent kinds of genetic analyses of living beings using genomic techniques and interpreting the results obtained.) Carry out diferent kinds of genetic analyses of living beings using genomic techniques and interpreting the results obtained.
- SM15 (Summarise the most relevant historical milestones in genetics, assessing their contributions to current biology.) Summarise the most relevant historical milestones in genetics, assessing their contributions to current biology.

Contents

Theory

1. Introduction to Genetics: Biogenesis, development and biological inheritance; Genetics as a modern science.
2. The hereditary material: Nature and organization; Genes and Genomes; the chromosomes.
3. Cell division: Celular cicle and mitosis; Sexual reproduction and meiosis.
4. Variations in the hereditaru material: Mutations and Allels; Somatic and Germinal Mutations; Chromosomal variation.
5. Basic principals of inheritance: Genetic transmission; The works of Mendel; Segregation and dominance; Independent transmission.
6. Extensions of Mendelism: Sex and inheritance patterns; Multiple allele series; Lethality; Gene interaction; Environmental effects.
7. Mapping of eukaryotic chromosomes: Chromosomes and linkage; Recombination; Eukaryotic linkage maps.
8. Quantitative genetics: Genetic basis of quantitative traits; Statistical analysis of the quantitative traits; Phenotypic variation and heritability; Artificial selection.
9. Population genetics: Genotypic and allelic frequencies; The law of Hardy-Weinberg; The sources of variation.

Classroom problems

1. Hereditary Material
2. Chromosomes
3. Probability
4. Statistics - Chi-square (χ^2)
5. Mendelian Genetics
6. Gene Interaction
7. Linkage and Recombination
8. Quantitative Genetics
9. Population Genetics

Laboratory practices

1. Introduction to the biology and morphology of *Drosophila melanogaster*
2. Analysis of a mutant and assignment to its linkage group
3. Elaboration of a simple linkage map

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Tutorials	5	0.2	
Laboratory practices	9	0.36	CM11, KM17, KM19, SM13, SM15
Lectures	30	1.2	CM11, KM16, KM17, KM18, KM19, SM13, SM15
Individual study	68	2.72	CM11, KM16, KM17, KM18, KM19, SM13, SM15
Moodle participation	10	0.4	
Problems sessions	11	0.44	KM16, KM18, SM13
Problems solving	10	0.4	KM16, KM18, SM13

The course is organized around four main types of learning activities: lectures, problem-solving sessions, laboratory practicals, and Moodle-based activities, each with its own specific teaching methodology.

Lectures: Students acquire the scientific knowledge associated with the course by attending lectures supported by information and communication technologies (ICT). These sessions are complemented by independent study of the topics covered in class. The audiovisual materials used during lectures will be available on the course Moodle site through the Virtual Campus. Lectures are primarily designed as a one-way method of knowledge transfer from the instructor to the students and therefore require students to develop autonomous learning strategies outside the classroom.

Problem-solving sessions: The knowledge acquired during lectures and through independent study is applied to the resolution of practical cases discussed in problem-solving sessions. These classes focus on developing problem-solving skills and on the application of statistical methods for data interpretation.

Laboratory practicals: Some of the practical cases introduced during the course are carried out in small-group laboratory sessions. Students become familiar with laboratory equipment and techniques while generating and analyzing their own experimental data. Laboratory protocols and practical guides will be available through the Virtual Campus. Attendance at laboratory sessions requires students to have successfully completed the biosafety and laboratory safety tests available on the Virtual Campus, as well as to be familiar with and accept the laboratory regulations of the Faculty of Biosciences.

Moodle activities: The Virtual Campus includes quizzes for each topic covering both theoretical concepts and problems addressed in class, as well as additional exercises that students must complete independently to reinforce the course contents.

Considerations on the Use of Artificial Intelligence:

PROHIBITED USE: The use of Artificial Intelligence (AI) technologies is not permitted in any of the course assessment activities, including laboratory practical exams, theory and problem-solving examinations, and assessed Moodle activities.

RESTRICTED USE: The use of Artificial Intelligence (AI) technologies is permitted exclusively for tasks such as literature searches, information retrieval, and as support for independent study activities. Whenever requested, students must clearly indicate whether AI tools have been used, identify which parts of the work were generated with AI, specify the tools employed, and include a critical reflection on how these tools influenced both the process and the final outcome of the activity. Failure to disclose the use of AI will be considered a breach of academic integrity and may result in penalties or more severe disciplinary measures in cases of serious misconduct. The teaching staff strongly encourages students to use AI with caution and recommends relying primarily on the bibliography suggested in the course syllabus and the resources available on the Virtual Campus.

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
Exams	75	6	0.24	CM11, KM16, KM17, KM18, KM19, SM13, SM15
Practices	15	0.5	0.02	CM11, KM16, KM17, KM18, SM13
Moodle activities	10	0.5	0.02	CM11, KM16, KM17, KM18, KM19, SM13, SM15

Assessment in this course is a continuous process throughout the teaching period and follows the Assessment Regulations of the Universitat Autònoma de Barcelona (UAB).

Students' achievement of the course learning outcomes will be assessed through the following activities:

1. Theory and problem-solving examinations: These examinations assess the competencies developed during the lectures and problem-solving sessions. Three midterm examinations (25 multiple-choice questions each) will be held throughout the semester. Each examination accounts for 25% of the final course grade.
2. Laboratory practical assessment: Each laboratory practical session will be assessed through a quiz completed at the end of the session. The average mark obtained in these quizzes will account for 15% of the final course grade. Attendance at all laboratory practical sessions is mandatory.
3. Problems and quizzes on the Virtual Campus (Moodle): Students are required to complete the problem sets and quizzes available on the course Moodle site through the Virtual Campus. Both performance and participation will be assessed. This component accounts for 10% of the final course grade.

Additional examination considerations

1. To pass the course, the weighted final grade for each of the three assessment components must be 5.0 or higher.
2. For the three theory and problem-solving midterm examinations to be averaged, students must obtain a minimum grade of 4.0 in each individual midterm. Otherwise, the course will be considered failed, and the student will be required to take the resit examination.
3. The only assessment activities eligible for resit are the written examinations. Students with a weighted final grade below 5.0, or with any individual midterm grade below 4.0, may sit a final resit examination. The mark obtained in the resit examination will replace the average grade of the three midterm examinations.
4. However, to be eligible for the resit examination, students must have previously completed assessment activities accounting for at least two-thirds (67%) of the total course grade. Consequently, students who have completed assessment activities representing less than 67% of the final grade will receive the final classification of "Not Assessed" (No Avaluable).

Single-term End Examination

Students who have opted for the Single-term End Examination modality will take the same final examination as students sitting the resit examination. This examination will account for 85% of the final course grade. The remaining 15% corresponds to the laboratory practical assessment, for which attendance is compulsory.

Students enrolled in the Single Assessment modality who obtain a weighted final grade below 5.0 may take an extraordinary resit examination. The mark obtained in this examination will replace only the grade previously obtained in the final Single Assessment examination.

Any irregularity committed during an assessment activity (academic misconduct, plagiarism, or improper use of AI, unless such use is expressly authorized in the course syllabus) that may lead to a significant alteration of the grade will result in that activity being graded as 0. If the course syllabus stipulates that obtaining a minimum mark in this assessment is an essential requirement to pass the course, or if multiple irregularities occur in the assessment activities of the same course, the final grade for the course will be 0. Furthermore, disciplinary proceedings may be initiated against any student who incurs any of these irregularities.

Bibliography

Theory

- Klug, W.S., M.R. Cummings, Ch.A. Spencer & M.A. Palladino (2013) Conceptos de Genética. 10a edició. Pearson Educación, S.A., Madrid. https://bibcercador.uab.cat/permalink/34CSUC_UAB/avjcib/alma991004958949706709
- Griffiths, A.J.F., S.R. Wessler, R.C. Lewontin & S.B. Carroll (2008) Genética. 9a edició. McGraw-Hill/Interamericana, Madrid. https://csuc-uab.primo.exlibrisgroup.com/permalink/34CSUC_UAB/avjcib/alma991008570979706709
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Problems

- Benito, C. (1997). 360 problemas de Genética. Resueltos paso a paso. Editorial Síntesis, Madrid
- Elrod, S. & W.D. Stansfield (2002) Schaum´s Outline of Genetics. 4th edition. Mc Graw-Hill, USA

Software

None

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	11	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	111	Catalan	first semester	afternoon
(PLAB) Practical laboratories	111	Catalan	first semester	morning-mixed
(PLABs) Suport a les pràctiques de laboratori	111	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	112	Catalan	first semester	afternoon
(PLAB) Practical laboratories	112	Catalan	first semester	morning-mixed
(PLABs) Suport a les pràctiques de laboratori	112	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	113	Catalan	first semester	morning-mixed
(PLABs) Suport a les pràctiques de laboratori	113	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	114	Catalan	first semester	morning-mixed
(PLABs) Suport a les pràctiques de laboratori	114	Catalan	first semester	morning-mixed